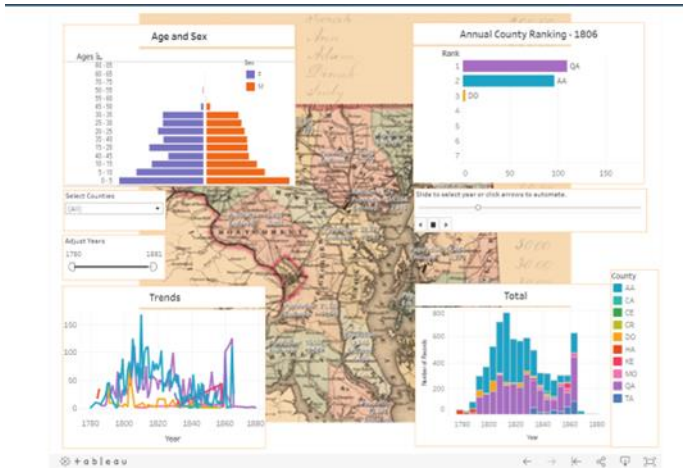
Historic Black Lives Matter:

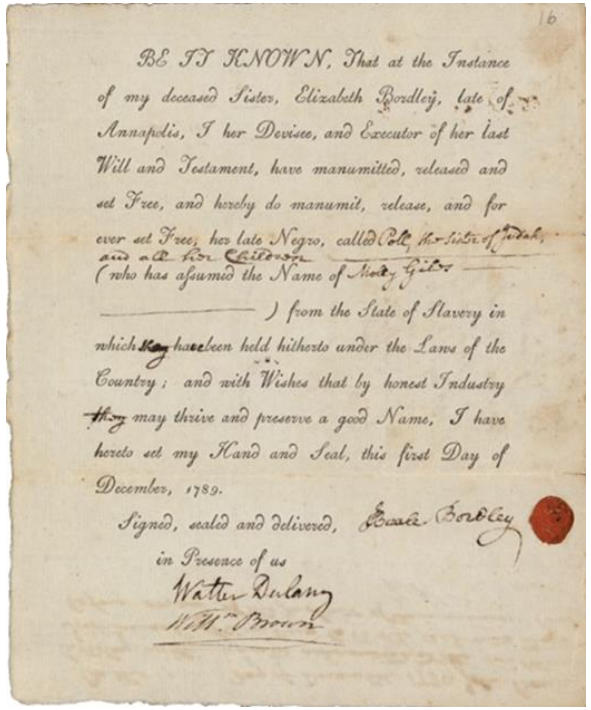
Recovering Hidden Knowledge in Archives Through Interactive Data Visualization

Lori A. Perine

AIC Research Fellow/Doctoral Candidate
University of Maryland/INFO
Assistant Professor, Mathematics, Statistics, and Data Science
Montgomery College

Presented at the :
9th Computational Archival Science (CAS) Workshop
December 17, 2024




BE IT KNOWN, That at the Instance of my deceased Sister, Elizabeth Bordley, late of Annapolis, I her Devisee, and Executor of her last Will and Testament, have manumitted, released and set Free, and hereby do manumit, release, and for ever set Free, her late Negro, called Cole, the Sister of Judah, and all her Children (who has assumed the Name of Molly Gibbs) from the State of Slavery in which they have been held hitherto under the Laws of the Country; and with Wishes that by honest Industry they may thrive and preserve a good Name, I have hereto set my Hand and Seal, this first Day of December, 1789.

Signed, sealed and delivered, Horace Bordley

in Presence of us

Walter Dulany

Wm. Brown

Welcome/Today's Presentation

- HBLM Background/Motivation
  - Why Visualize Archives
  - Extension of CT-LOS
  - HBLM Design and Research Objectives
- Implementing Workflow for Data Visualization with Archival Collections
- Key Takeaways
- Questions and Answers

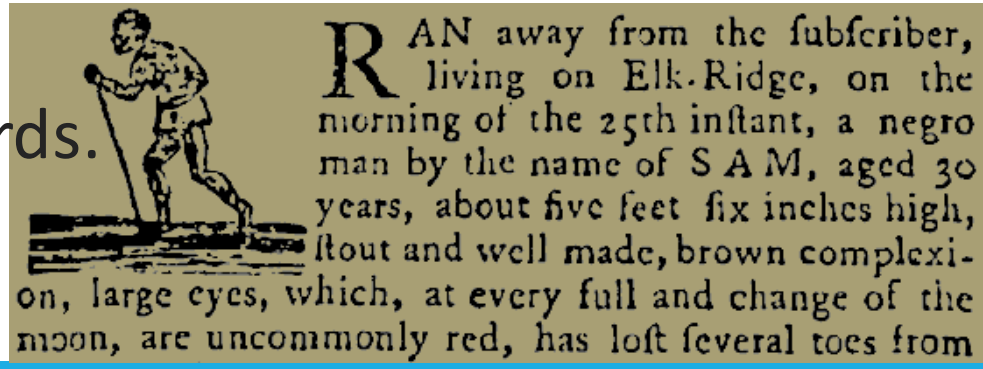
Background and Motivation

Why Visualize Archival Records?

- Opens possibilities to view the historical record through a different lens.

- Better representation of persons and events that tend to be marginalized or “erased” in the records.

- Aid discovery and enhance access to information and stories buried in archival records.

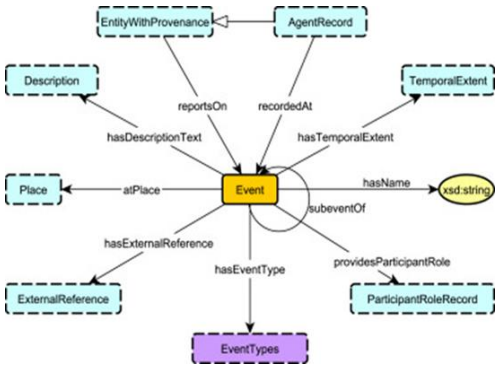

RAN away from the ſubſcriber, living on Elk-Ridge, on the morning of the 25th inſtant, a negro man by the name of SAM, aged 30 years, about five feet ſix inches high, ſtout and well made, brown complexion, large eyes, which, at every full and change of the moon, are uncommonly red, has loſt ſeveral toes from

HBLM extends CT-LOS

- Interdisciplinary research presented and published for IEEE Big Data 2020, CAS Workshop #5
- Explore application of computational methods to enhance discovery of histories of marginalized communities .
- Adopt computational thinking for case study conceptualization and implementation
- Address socio-technical context in application of computational treatments.
- Demonstrate experiential, interdisciplinary, team-based learning for information professionals
- Create learning/teaching artifacts
- UMD Collaborators: Dr. Richard Marciano, R.K. Gnanasekaran, P. Nicholas, A. HIll
- Community Partner/Collaborator:

Maryland State Archives

Legacy of Slavery Program



Research Topics Proposed by CT-LOS

- **Interactive visualization with existing data sets**
- Textual data-mining with existing data sets
- *Graph database and cross-collection connections*
- Adapt ontology for enslaved populations for better representation of actors, relationships, and events
- Metadata extensions or “retrofits” to enable connections across collections
- Probability models and machine learning to automate connection discovery

HBLM Design Overview

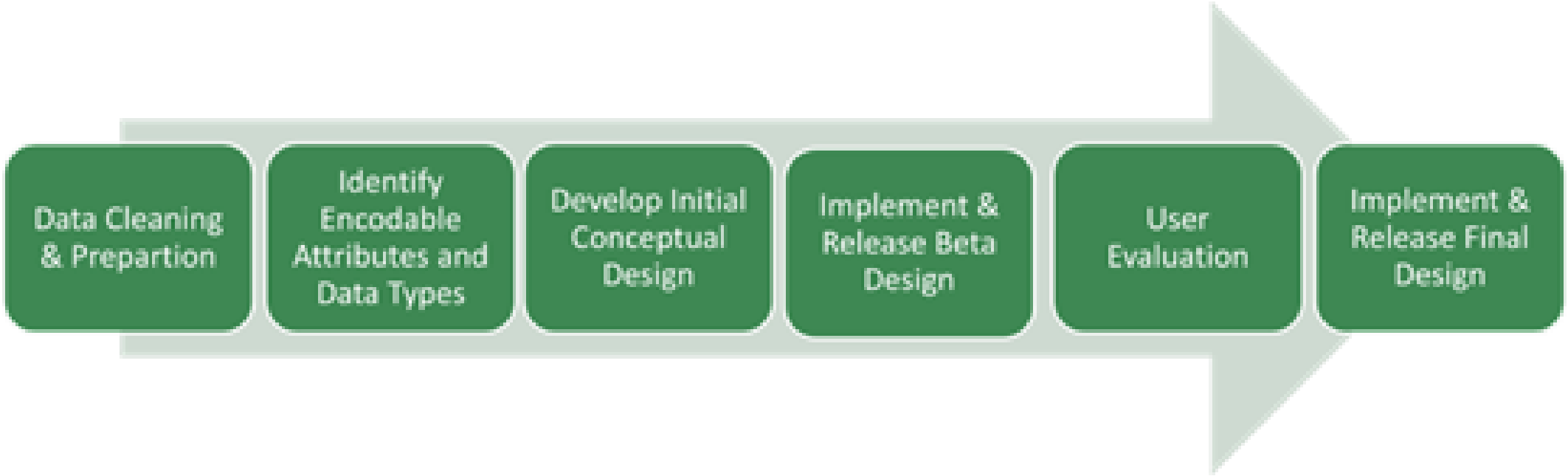
- Extension of the CT-LoS research, focusing on the manumissions data
- Create a series of web-based visualizations to enhance the MSA's interactive offerings, which target educators and researchers
- Explore how design principles and interactive and/or dynamic implementation can enhance user engagement with collections.
- Create learning/teaching artifacts
- Community Partner:

Maryland State Archives
Legacy of Slavery Program

Research Methodology: Data visualization design and case study. Dissemination via public web-based interactive data visualization and published blog on the VisUMD site via Medium.

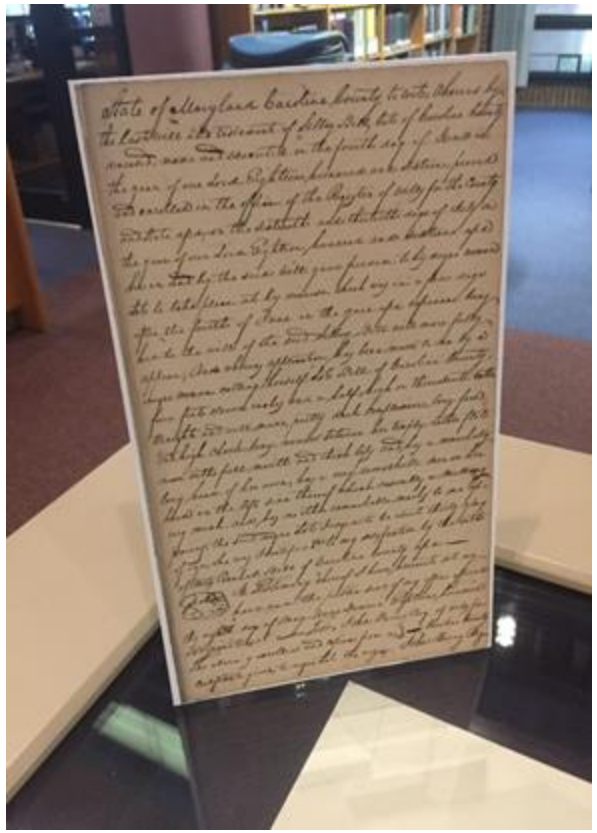
Design Objectives	Design Methods
(OBJ1) Ensure representation of the human beings encoded within the data	Multiple interactive interfaces to vary perspective of data engagement. Uniform color coding, element layout, and use of dynamic and interactive elements.
(OBJ2) Provide an interface that allows users to easily engage with the data	Beta testing and user evaluation
(OBJ 3) Facilitate discovery and communication of information contained in the collections, while taking into account the limitations of the data.	Selective use of design elements and interactive interfaces to represent 1)people, 2)Time and place, 3) geography, and overview.

Implementing a Visualization Workflow

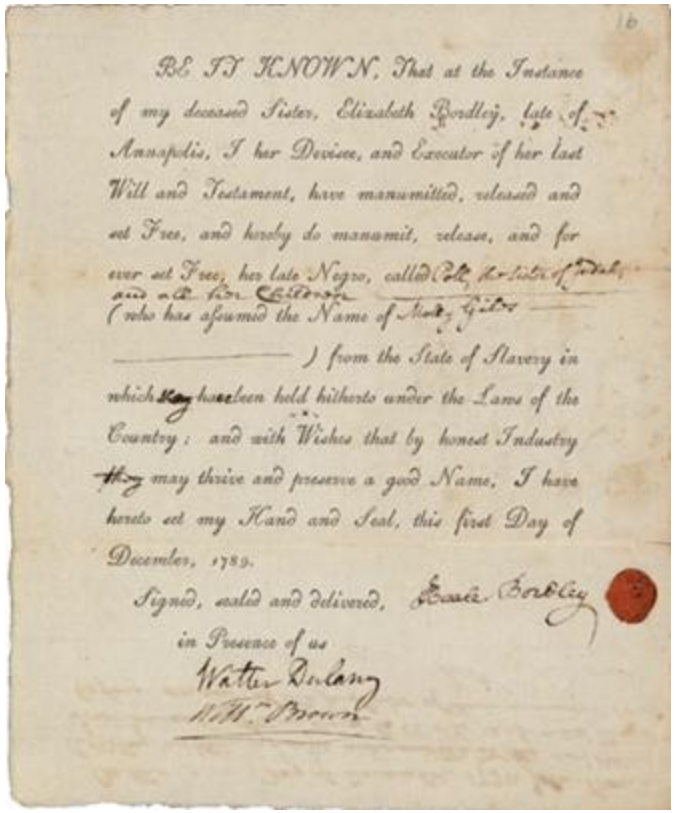


Step 1: Data Cleaning & Preparation

Data Sourcing: Freedom Records from the MSA (I)



Certificate of Freedom



BE IT KNOWN, That at the Instance of my deceased Sister, Elizabeth Bordley, late of Annapolis, I her Devisee, and Executor of her last Will and Testament, have manumitted, released and set Free, and hereby do manumit, release, and for ever set Free, her late Negro, called [illegible] and all her Children (who has assumed the Name of [illegible]) from the State of Slavery in which they have been held hitherto under the Laws of the Country; and with Wishes that by honest Industry they may thrive and prosper a good Name. I have hereto set my Hand and Seal, this first Day of December, 1789.

Signed, sealed and delivered, [illegible] Bordley

in Presence of us

Walter Delany

Wm. Brown

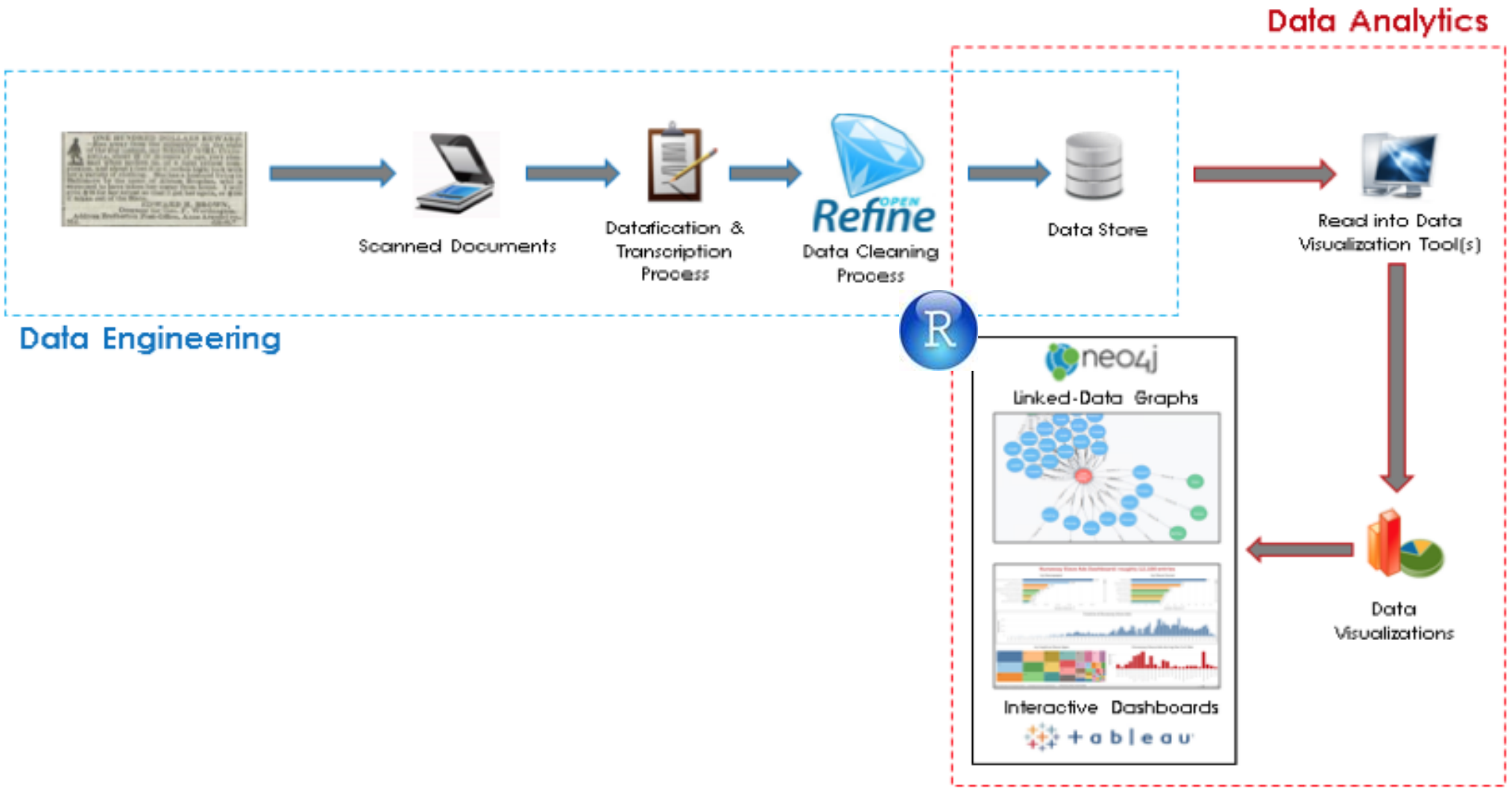
Manumissions Documents

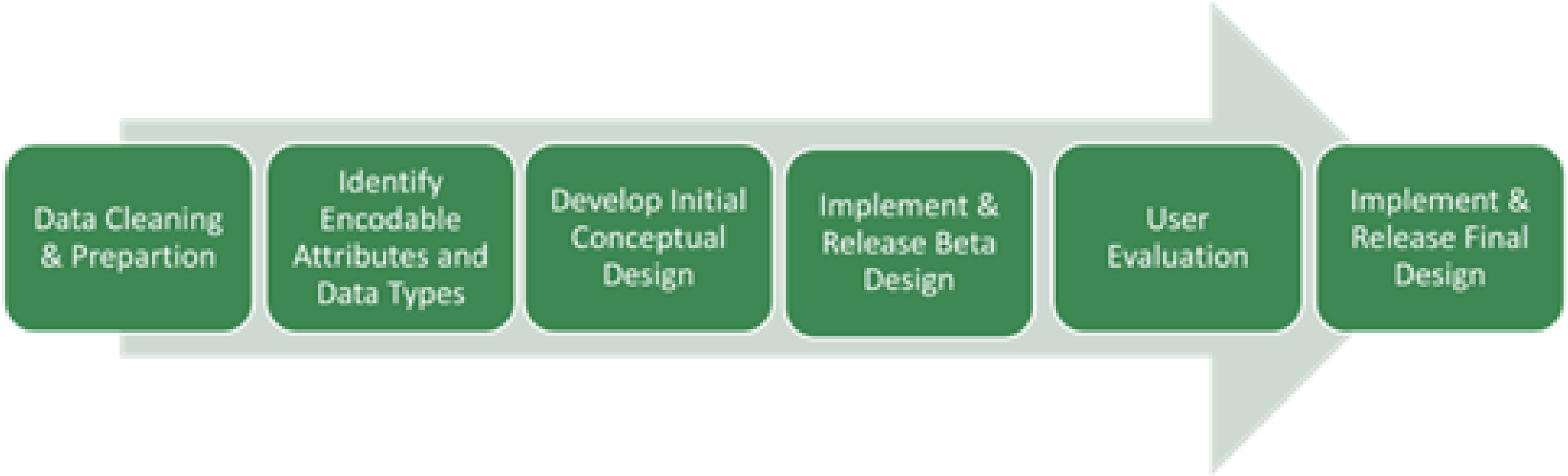
Data Sourcing: Freedom Records from the MSA (2)

A **manumission** is the legal document freeing an enslaved person. Manumissions can be found in land, probate, and chattel records. There is also a separate record series called Manumissions.

A **Certificate of Freedom** is a legal document that was issued to African Americans who were required to record proof of their freedom in the county court. The court would then issue them a Certificate of Freedom. If the person had been previously manumitted by an act of the slaveholder, the court clerk or register of wills would look up the manumitting document before issuing a certificate of freedom.

Enhanced Data Flow from Original Source Documents to Computational Exploration

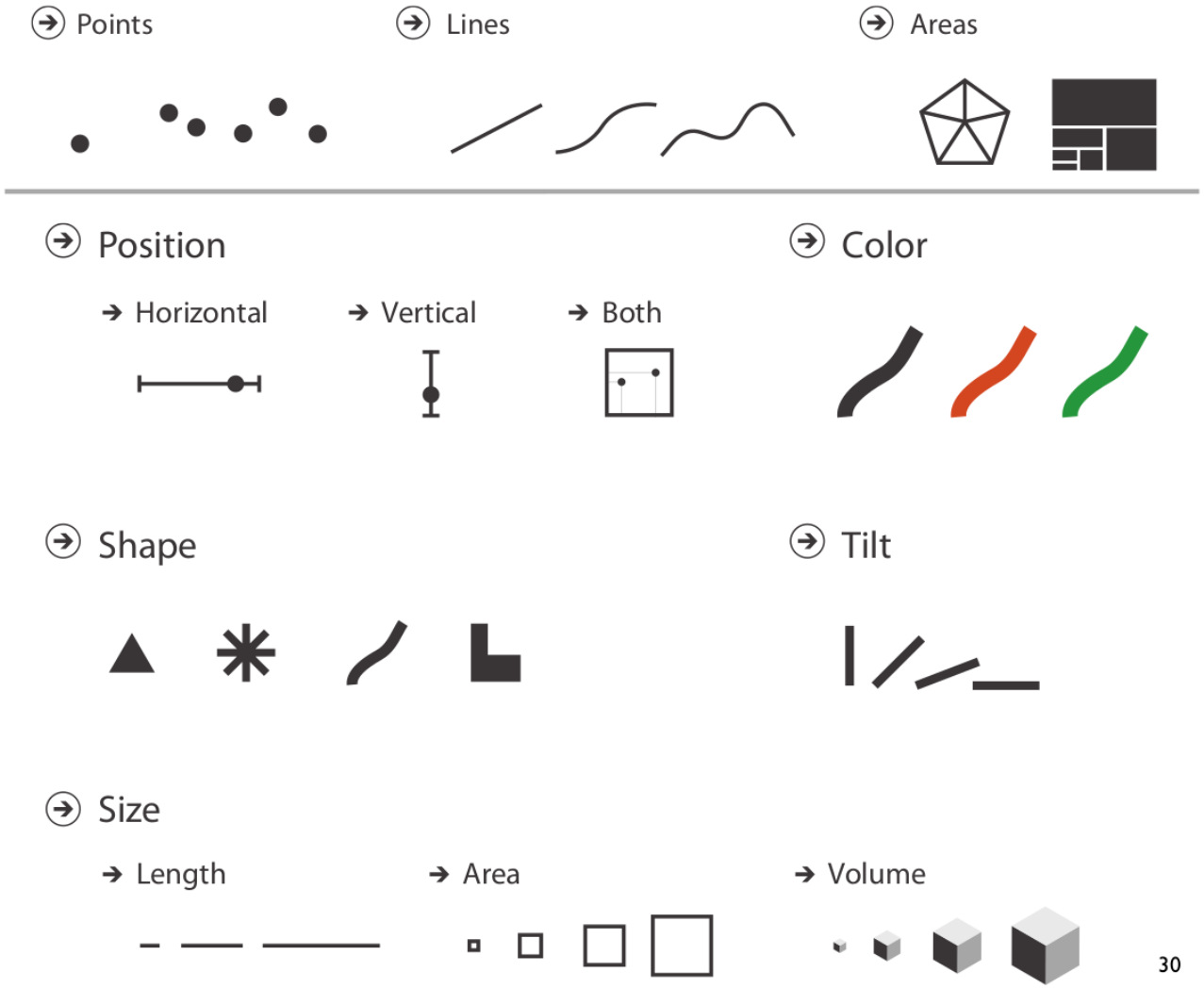


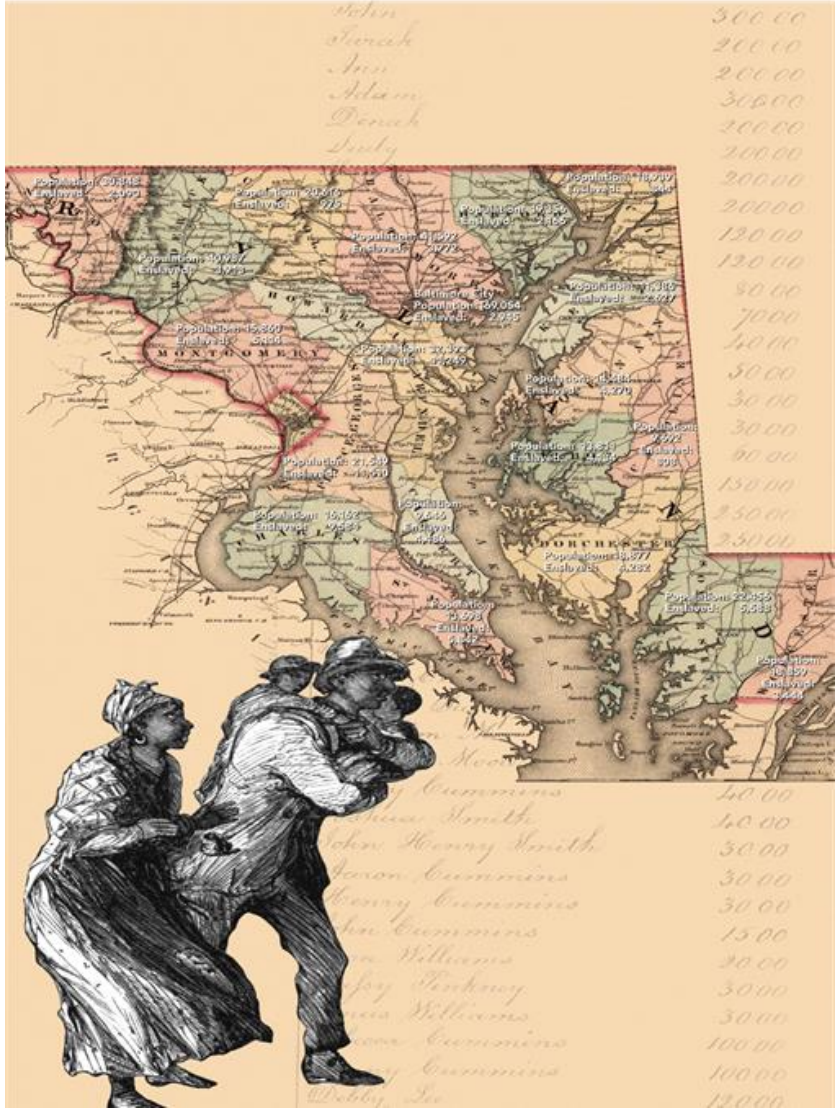


Step 2: Encodable Attributes

Definitions: Marks and channels

- marks
  - geometric primitives
- channels
  - control appearance of marks
  - can redundantly code with multiple channels





Viz Design Challenges

Text, text, text!

Non-standard information

Representation of human beings

Engage and Communicate

Ideal design vs. technical capability

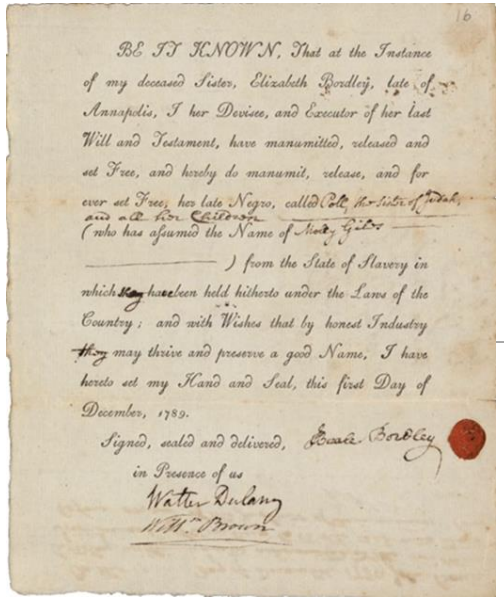
Basic Descriptive Analytics: Manumissions & Certificates of Freedom Data

Manumissions

- Number of Records: 7,399 initial cleaned
- Geographic Coverage: 10 of 24 counties
- Year Issue: 1770-1870
  (delayed manumissions)
- Age Range: 0 (infant) – 80
  (original max = 237)
- Male: 47.9%
- Female: 51.7%
- Unknown: 523

Certificates of Freedom

- Number of Records: 23,655
  *Possible Duplicate Records
- Geographic Coverage: 16 counties & 1 city
- Year Issue: 1806-1864
- Age Range: 3 months-82 years old
- Male: 93% (21,887)
- Female: 5% (1,082)
- Unknown: 2% (686)



BE IT KNOWN, That at the Instance of my deceased Sister, Elizabeth Bordley, late of Annapolis, I her Devisee, and Executor of her last Will and Testament, have manumitted, released and set Free, and hereby do manumit, release, and for ever set Free, her late Negro, called Cato, her Sister of Cato, and all her Children (who has assumed the Name of Moses Gates) from the State of Slavery in which they have been held hitherto under the Laws of the Country; and with Wishes that by honest Industry they may thrive and preserve a good Name, I have hereto set my Hand and Seal, this first Day of December, 1789.

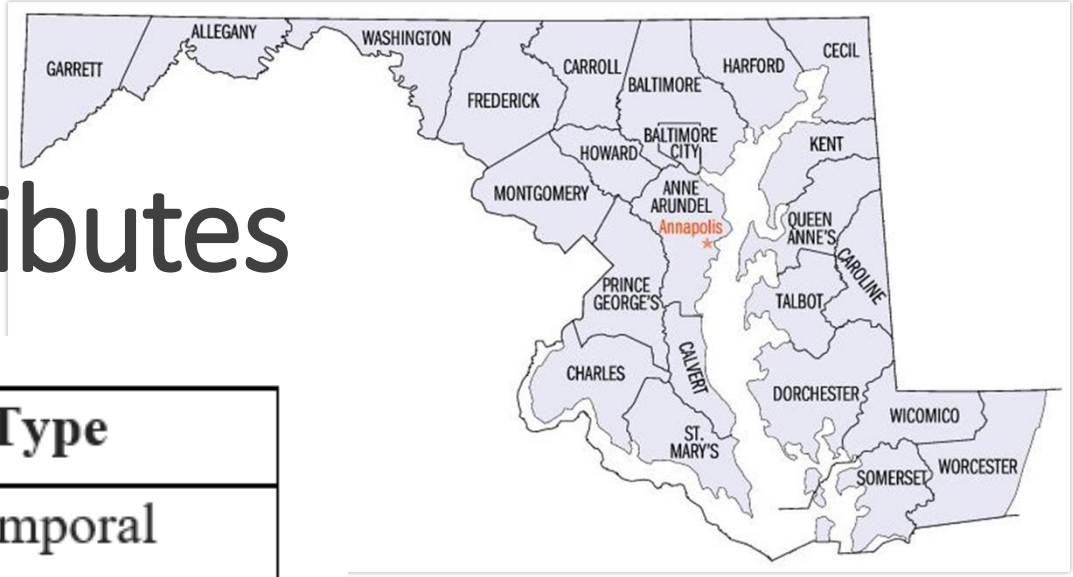
Signed, sealed and delivered, Elizabeth Bordley

in Presence of us

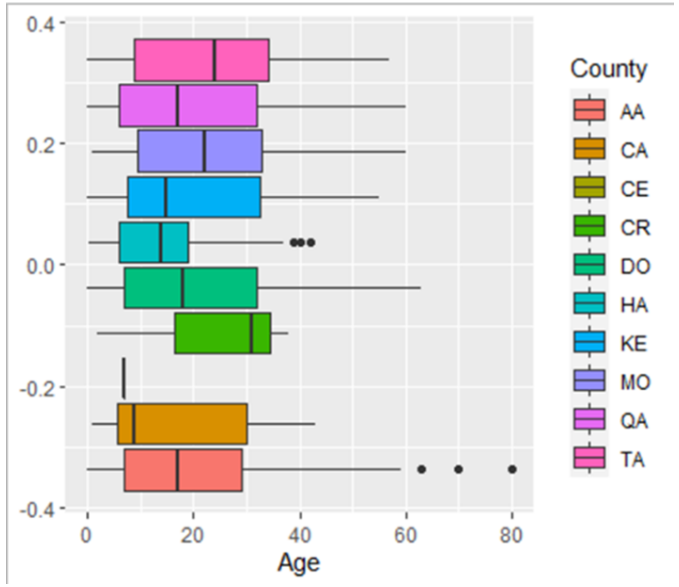
Walter Dulany

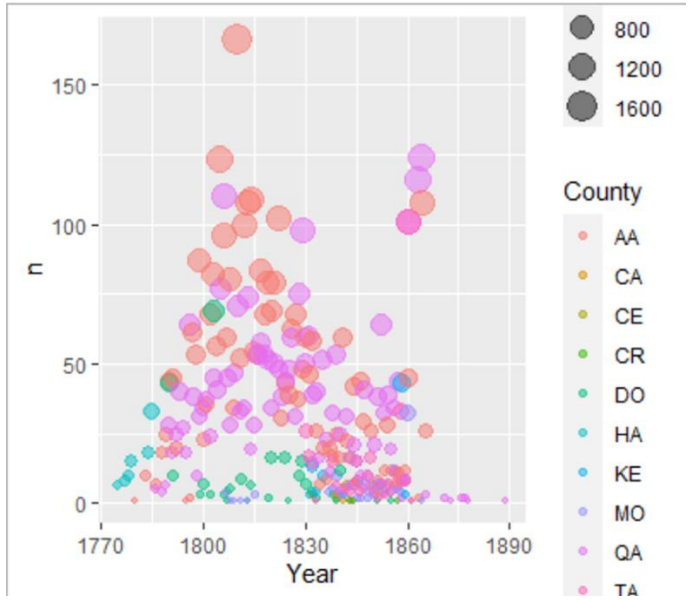
W. H. Brown

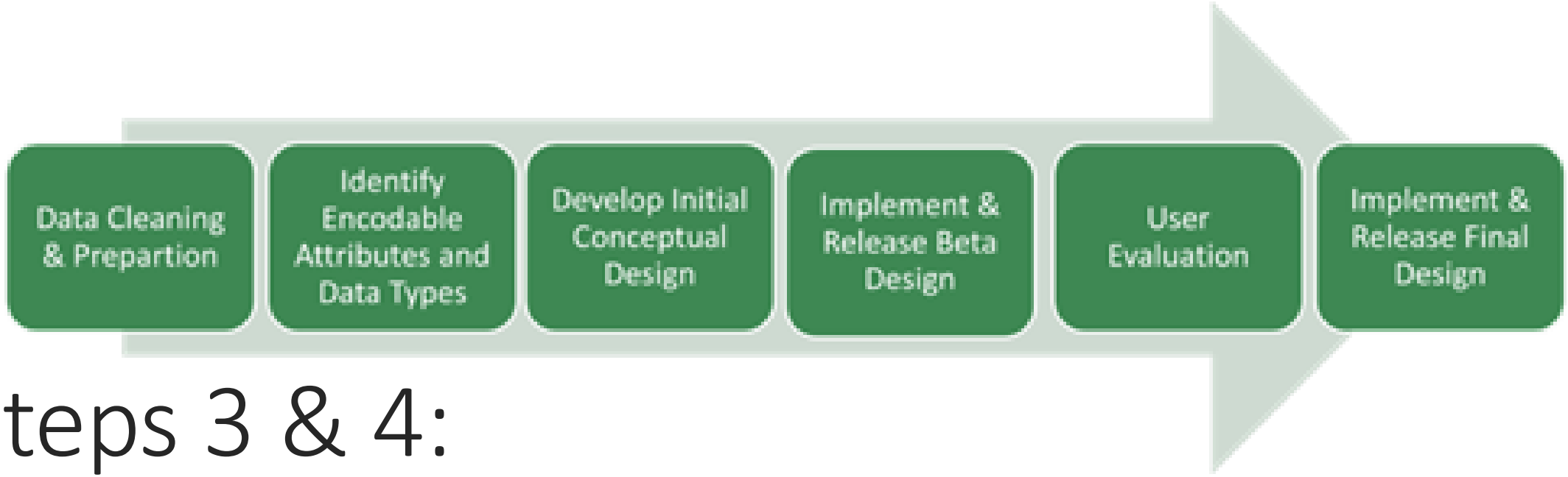
Encodable Attributes



Attribute	Type
Year	Temporal
County	Categorical
Age	Quantitative
Gender	Categorical

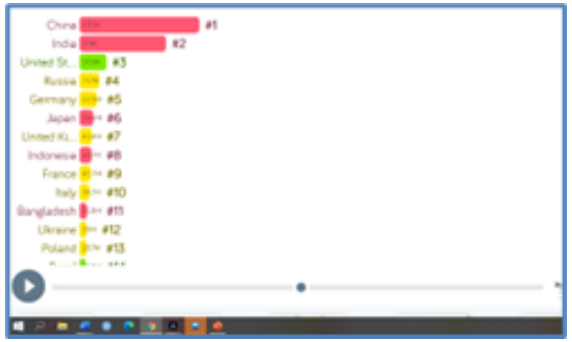


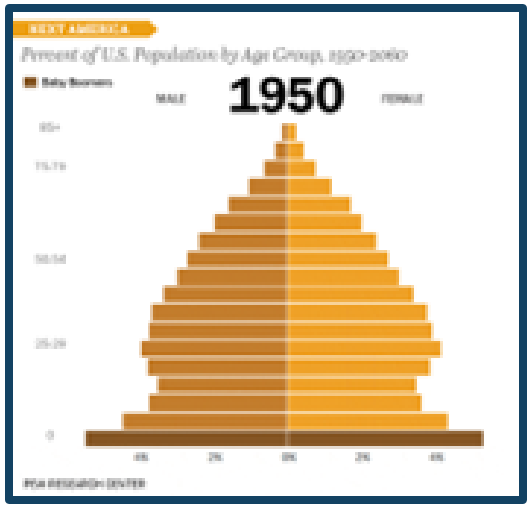




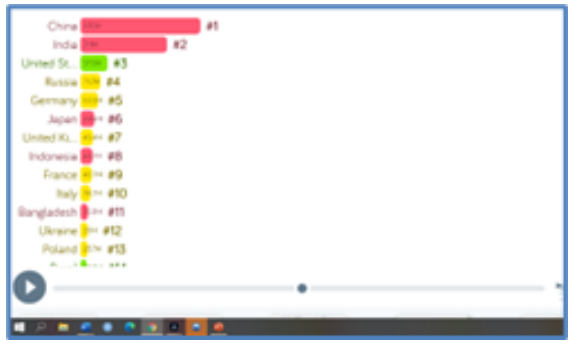
Steps 3 & 4: Conceptual Design and Beta Implementation

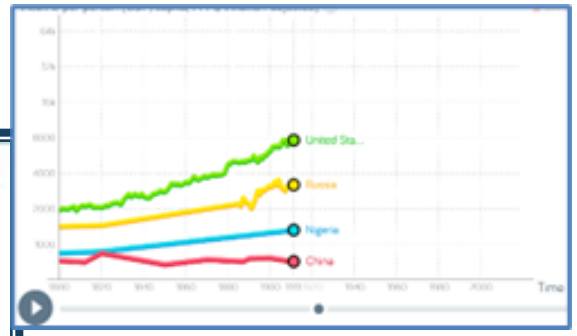
Conceptual Inspiration to Beta Implementation (1)



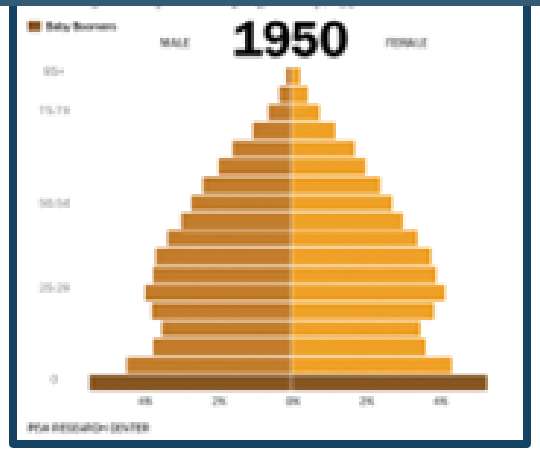


Conceptual Inspiration to Beta Implementation (2)

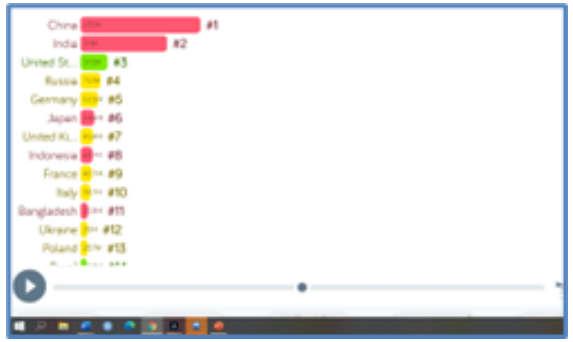


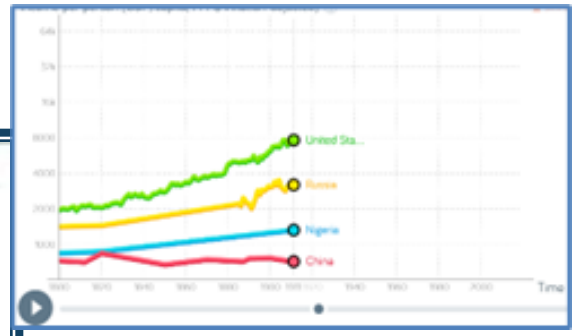


Interactive trend plot by county (color)
Manumissions (vertical axis)
Year (horizontal axis)
Dynamic timeline (interactive slider)
Tip Point (labels, numbers)

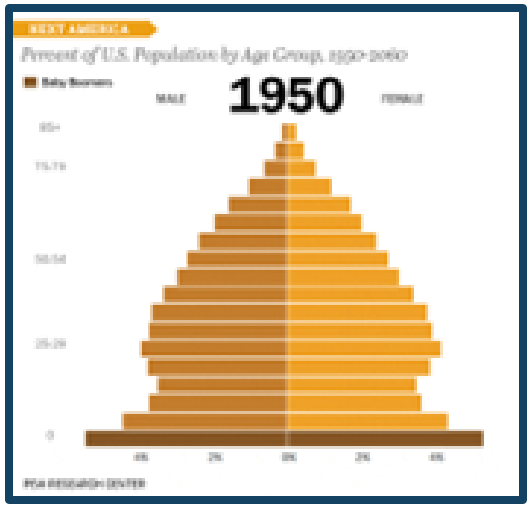


Conceptual Inspiration to Beta Implementation (3)

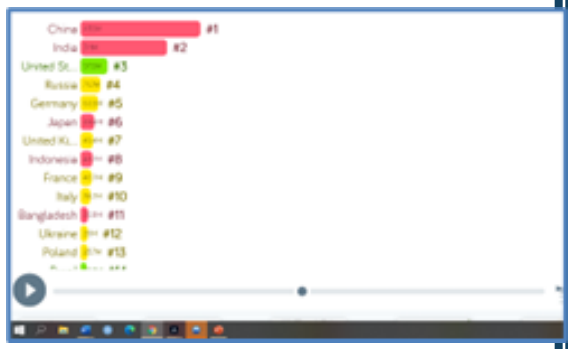




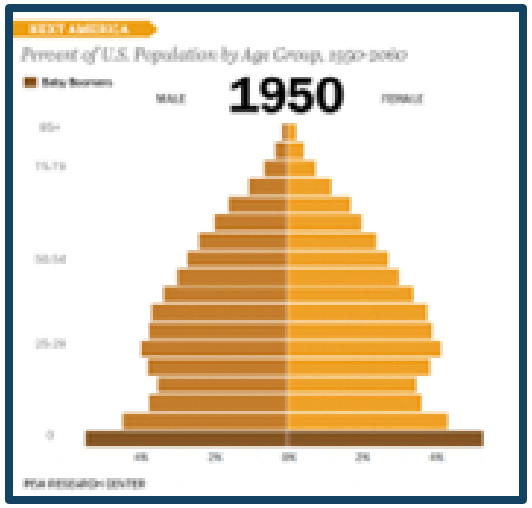
Dynamic ranking pareto bar plot
Counties (color & vertical axis)
Manumissions (horizontal axis and bar length)
Year (changes in bar length)
Slider/animation to change position of ranking bars



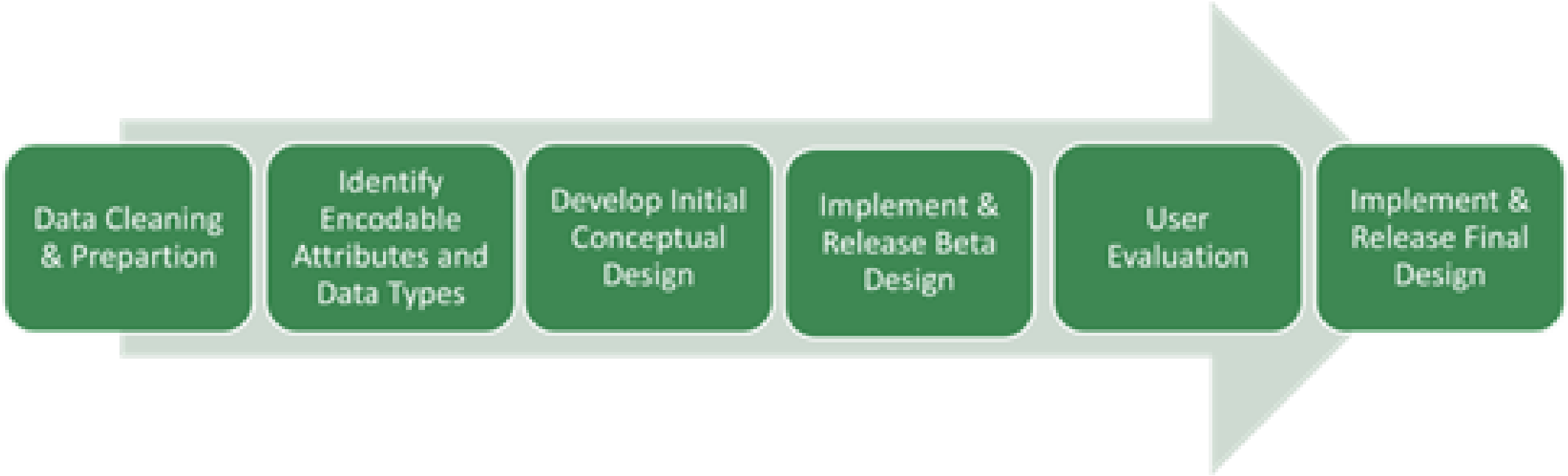
Conceptual Inspiration to Beta Implementation (4)



Dynamic age pyramid grouped by gender
Age group (vertical axis)
Percentage (horizontal axis)
Gender (color)
Selectors and pop-ups



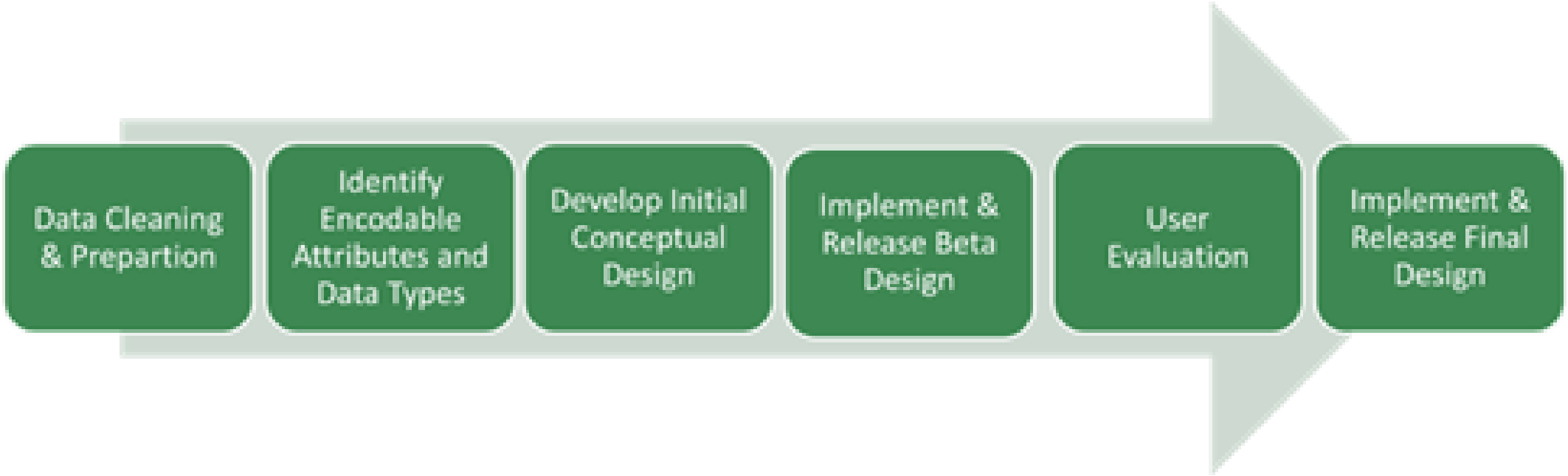
Conceptual Inspiration to Beta Implementation (5)



Step 5: User Evaluation

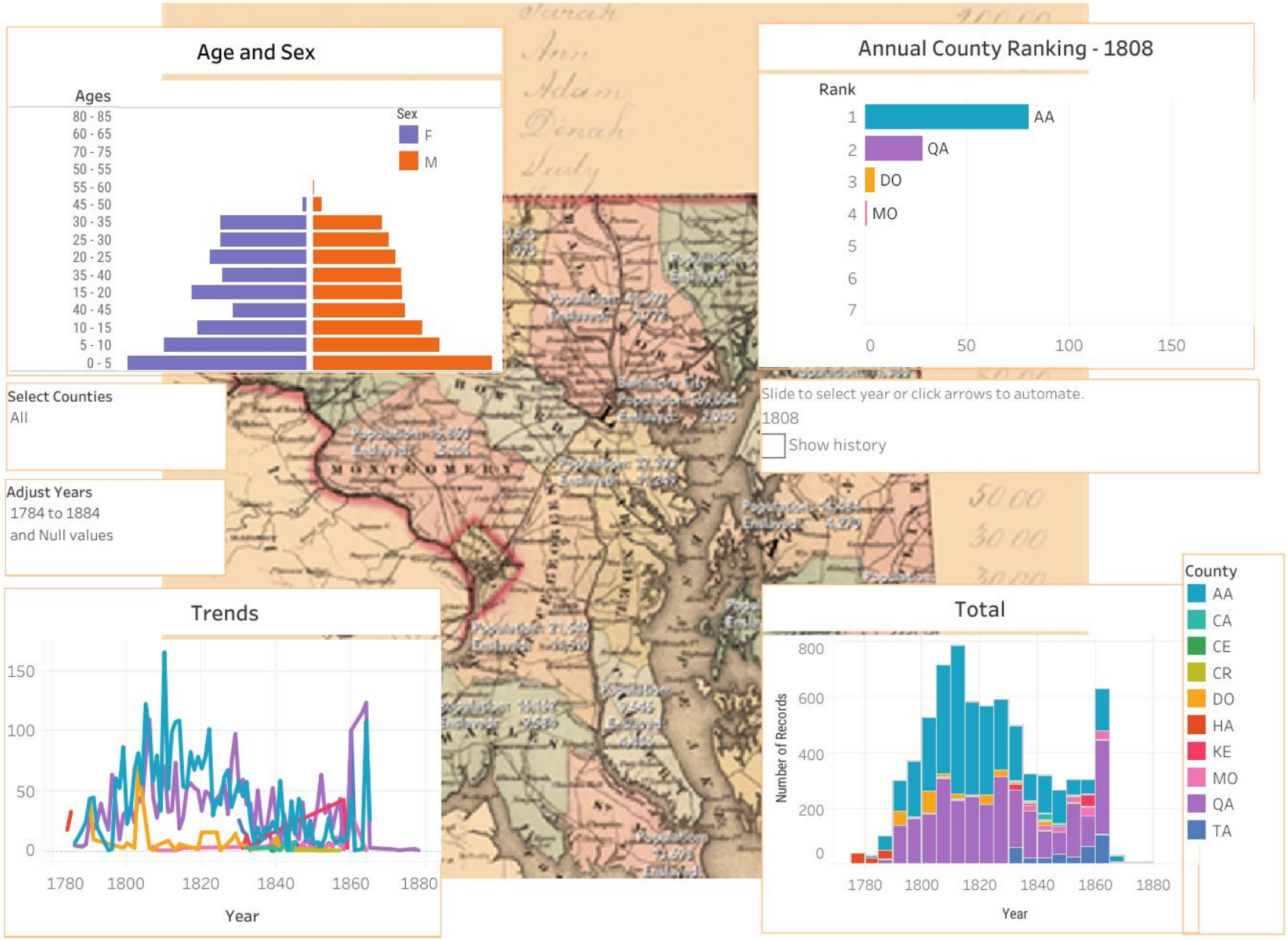
Key Findings

1. Liked the layout; interesting and informative.
2. Color palette challenge for the colorblind reviewer. Also, the color coding for the age/pyramid chart caused some confusion.
3. Position of components incentivized interaction … or not
4. Tool tip numbers weren't always obvious



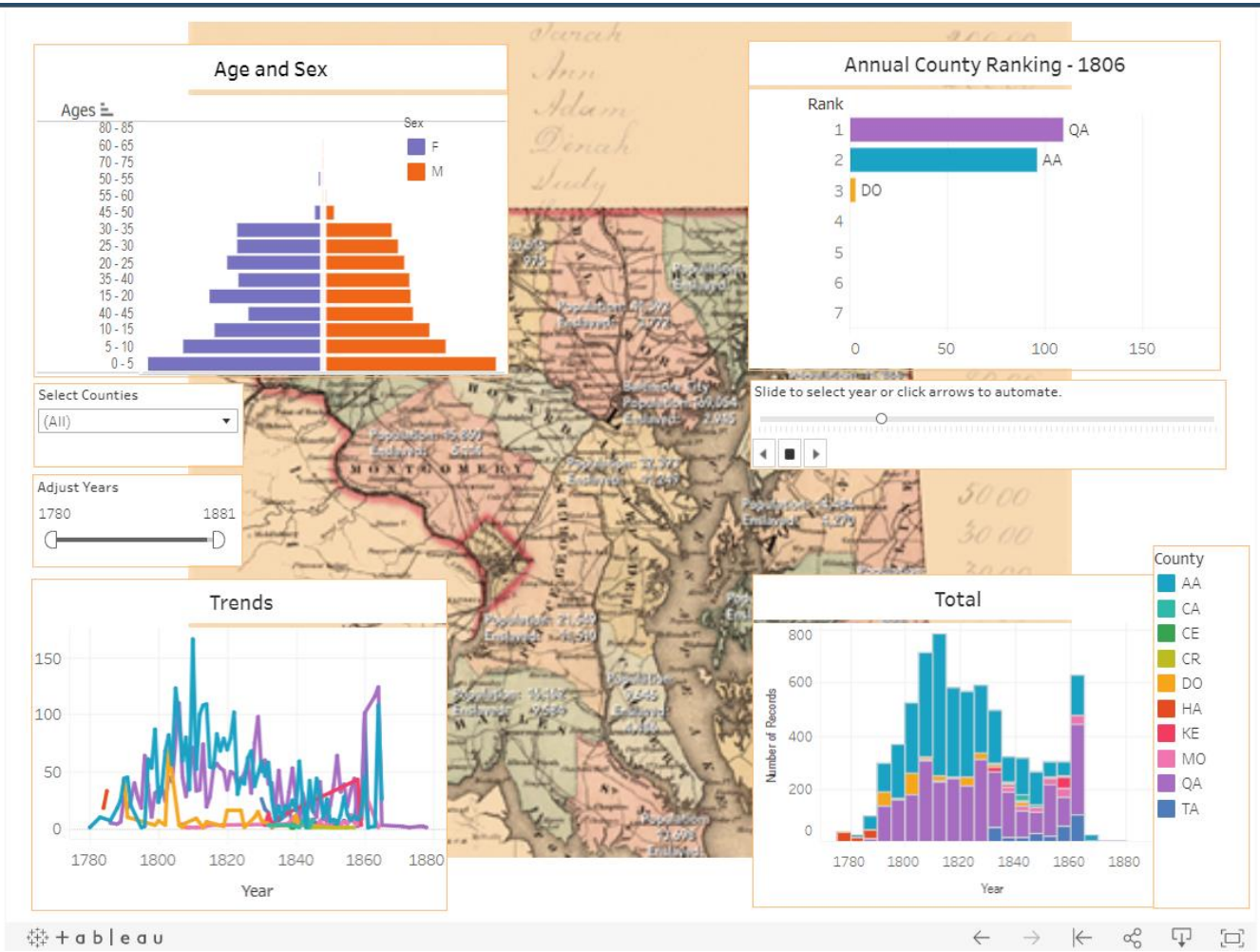
Step 6: Final Design

Manumissions in the State of Maryland, 1774-1874



Viz Demonstration – Tableau Dashboard

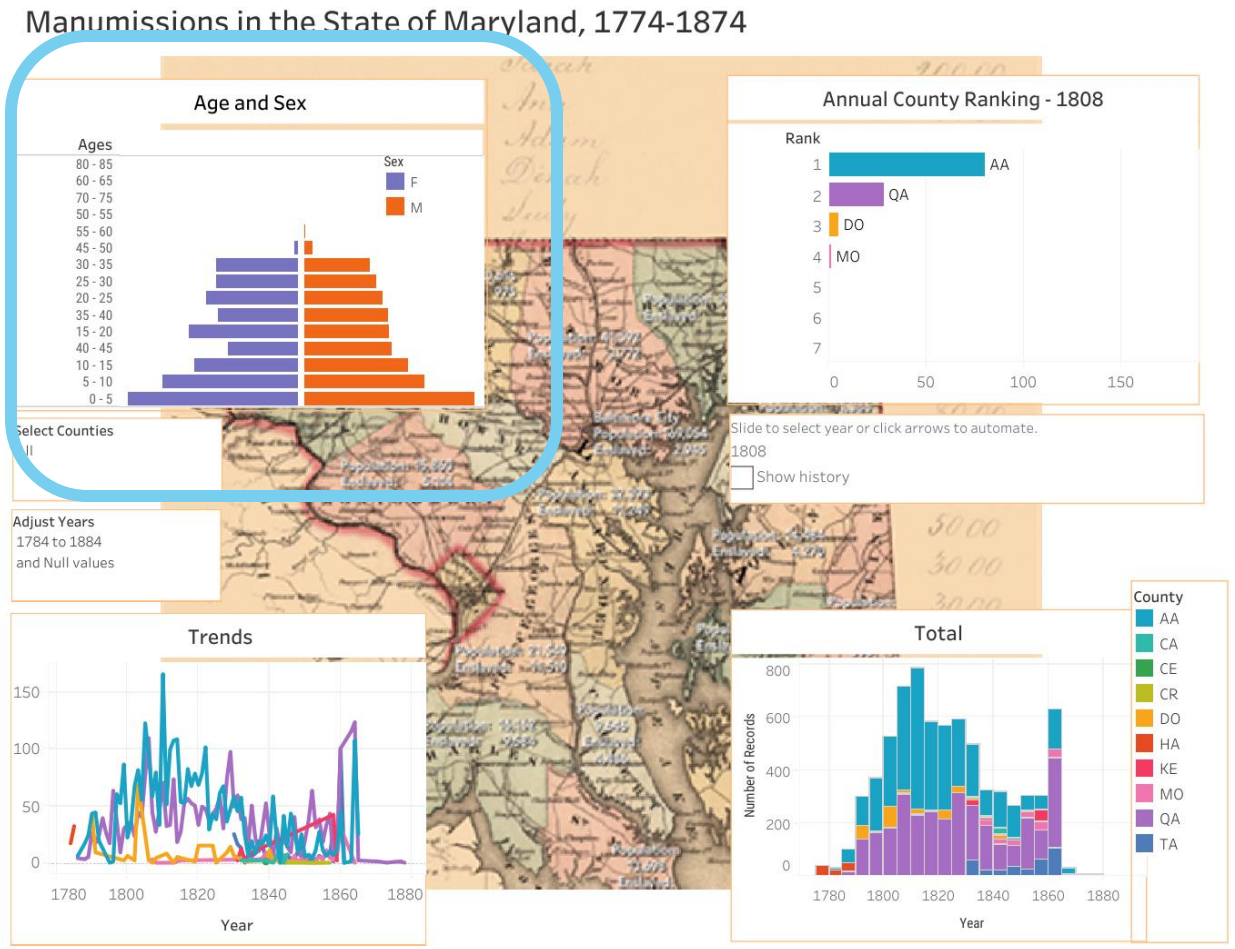
https://public.tableau.com/app/profile/l.a.perine/viz/ManuVizPresentation/ManumissionsintheStateofMaryland1774-1874



Design Element 1: The People

How old were people when they were granted their freedom? Were they male or female? Are there differences among the counties in who was granted freedom — and when?

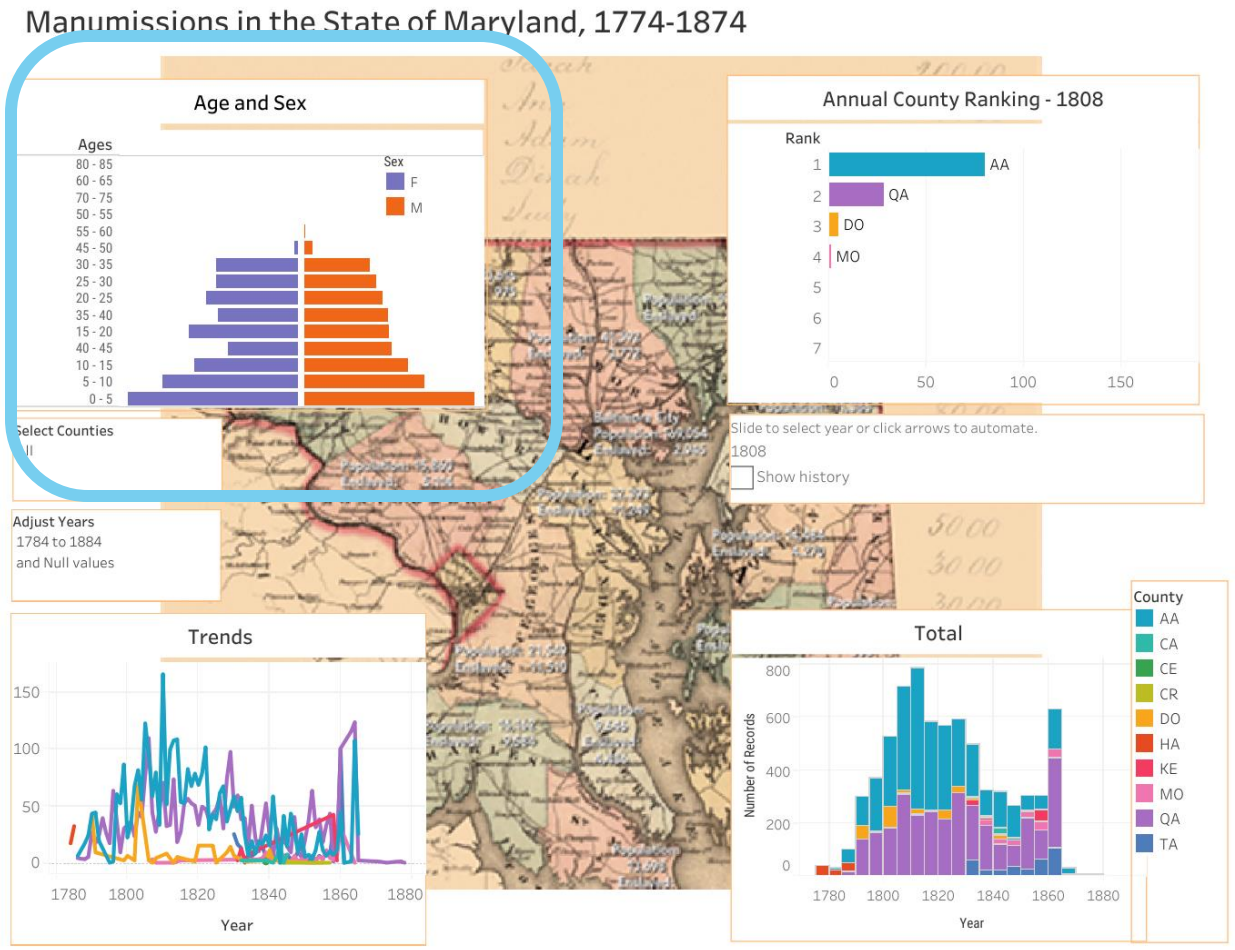
- **Interactive** population pyramid most directly represents enslaved persons
- Highlighted by its **position** on the top left
- **Vertical axis** is age group and the **horizontal axis** is number of manumissions records
- The **tooltip feature** of Tableau allows the user to see the exact count in each bar by hovering the mouse over the bar.
- Female/male sides are distinguished by **color**.
- Default view is **static,** illustrating information for all counties and all years within the data.
- The general **year slider and/or county selector** can be used to spotlight information about the population who whom manumission is conferred, by county, by range of years, or both.



Design Element 1: The People

Example of Recovered Knowledge

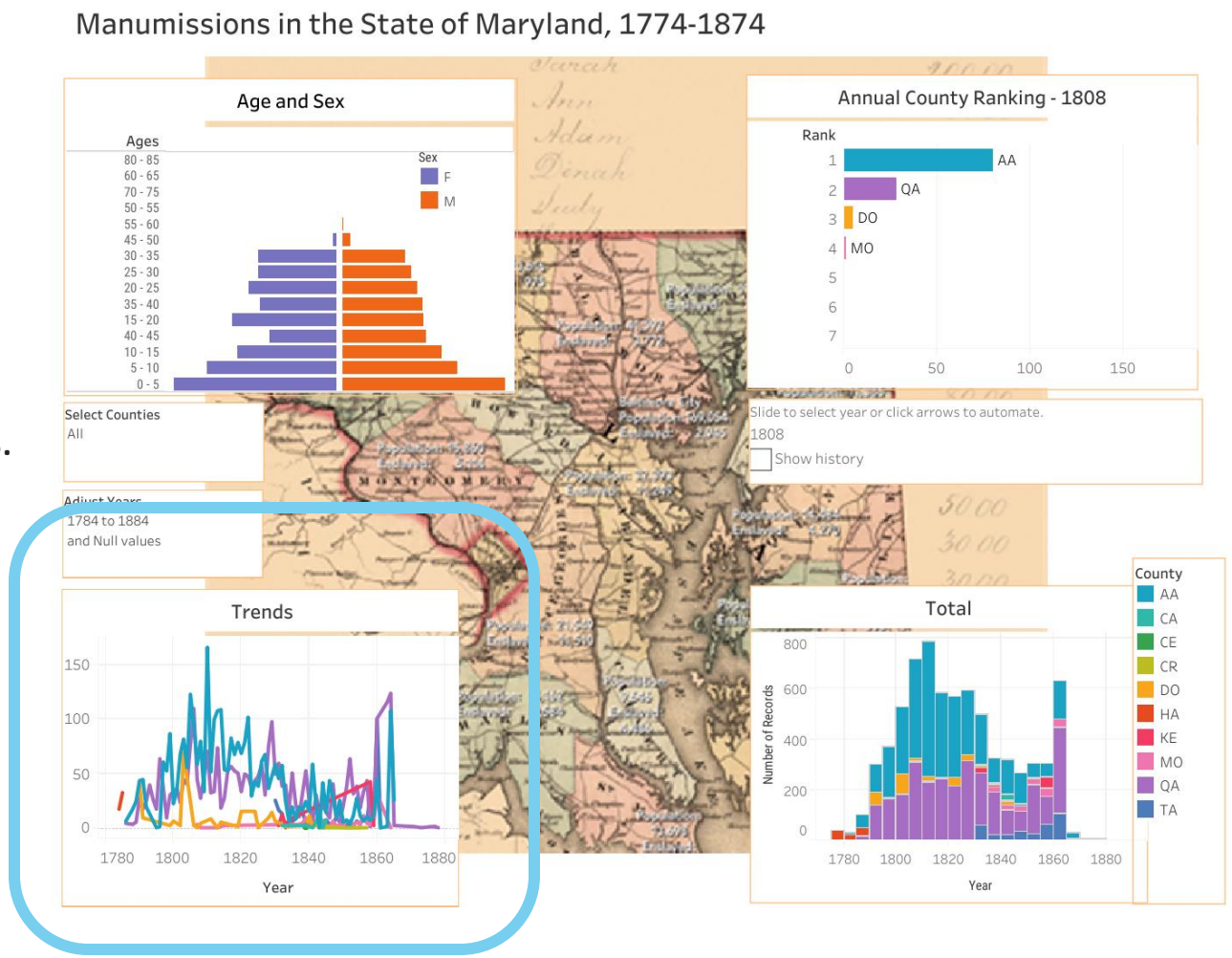
The distribution of ages at which enslaved people were granted freedom and whether the person was female or male provides a window into how legal norms and practices impacted individual lives of Maryland's Black antebellum population. By using the interactive features, the user can examine how patterns vary over time and by county. It should be noted that this visualization do not allow us to distinguish certain phenomenon uncovered through other analysis, such delayed manumissions which confer freedom at a later age.



Design Element 2: Time and Place

What are the trends in manumissions over time? How do they compare from county to county?

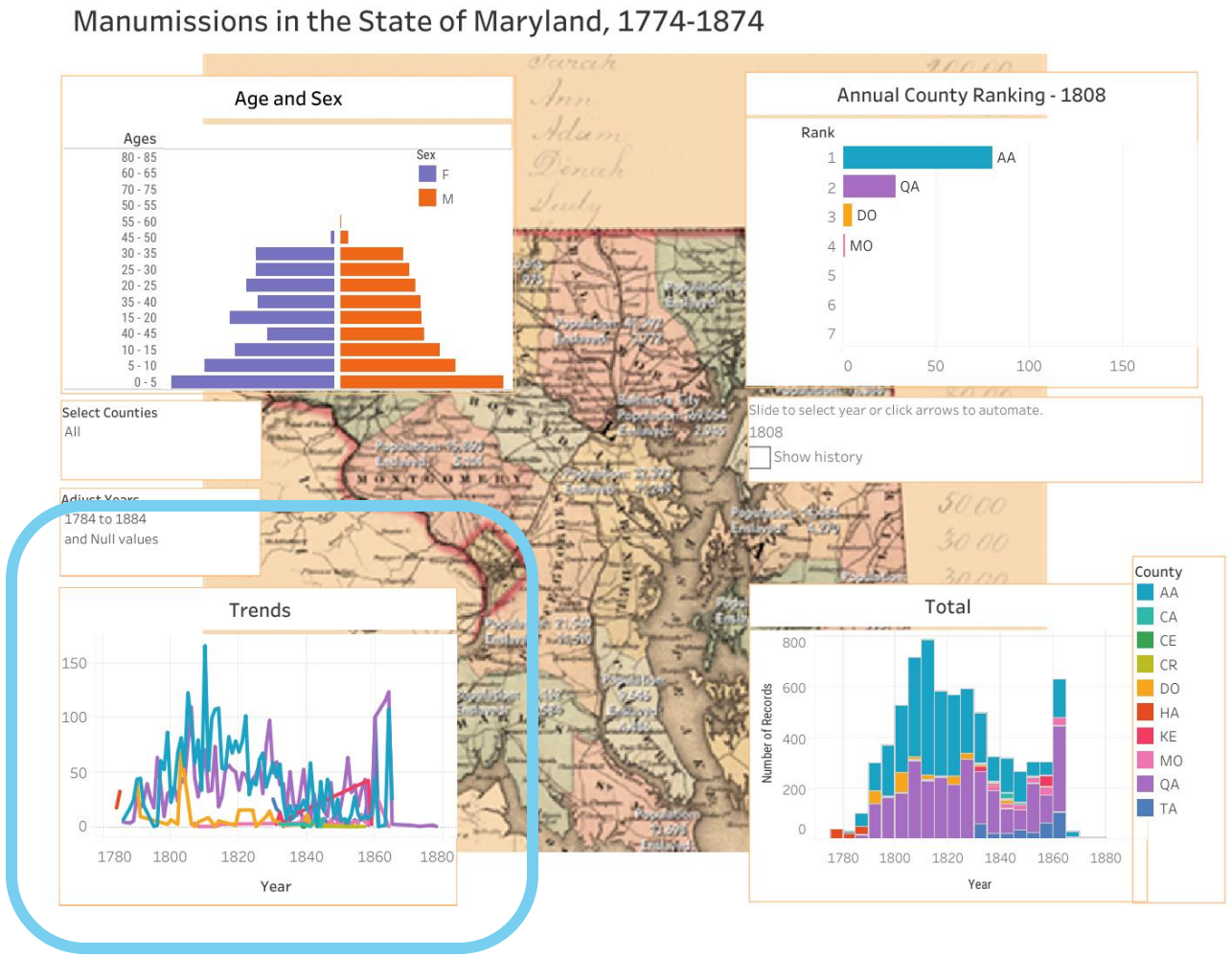
- **Interactive trend plot** of the annual frequency (number) of manumissions by county.
- Linked directly to the population pyramid, via **the year and county selectors**, for complete trends in manumissions and the populations they are impacting
- **Vertical axis** represents the number of manumissions. **Horizontal axis** represents year
- **Interactive slider** creates dynamic timeline effect
- range of years can be chosen, for a **spotlight view** of the trend lines during a customized period of time.
- The **tooltip feature** gives the county, year, and the number of manumissions
- **Common color coding** is used to represent the trend lines of individual counties.



Design Element 2: Time and Place

Example of Recovered Knowledge

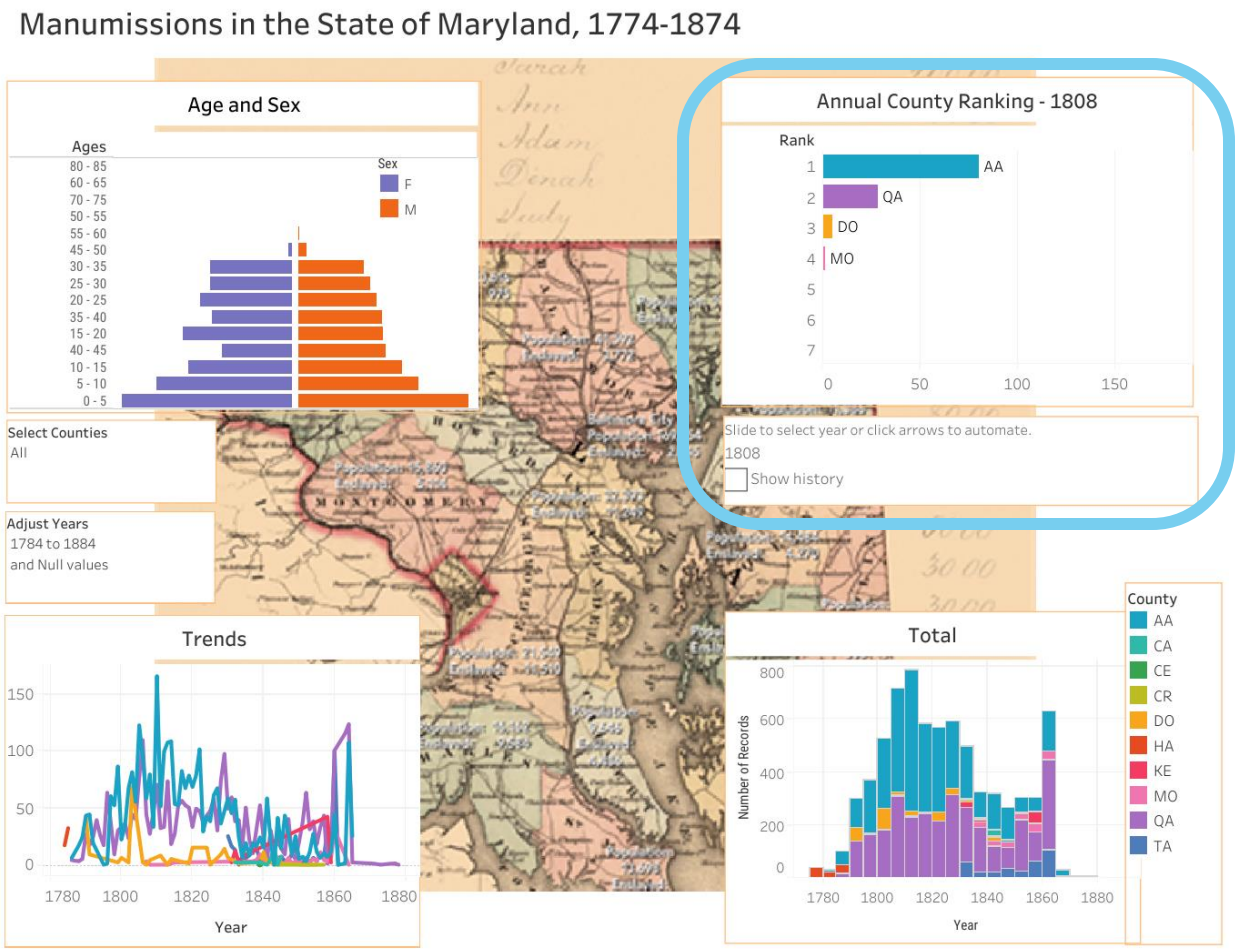
The trends show distinct periods when manumissions rise and fall, with some peaks occurring well in advance of the Civil War and Maryland's emancipation declaration in 1864. These patterns direct our attention to historical events or movements that facilitated or hindered freedom for enslaved populations.



Design Element 3: Geographic Focus

How do counties rank by numbers of manumissions and how does that change over time?

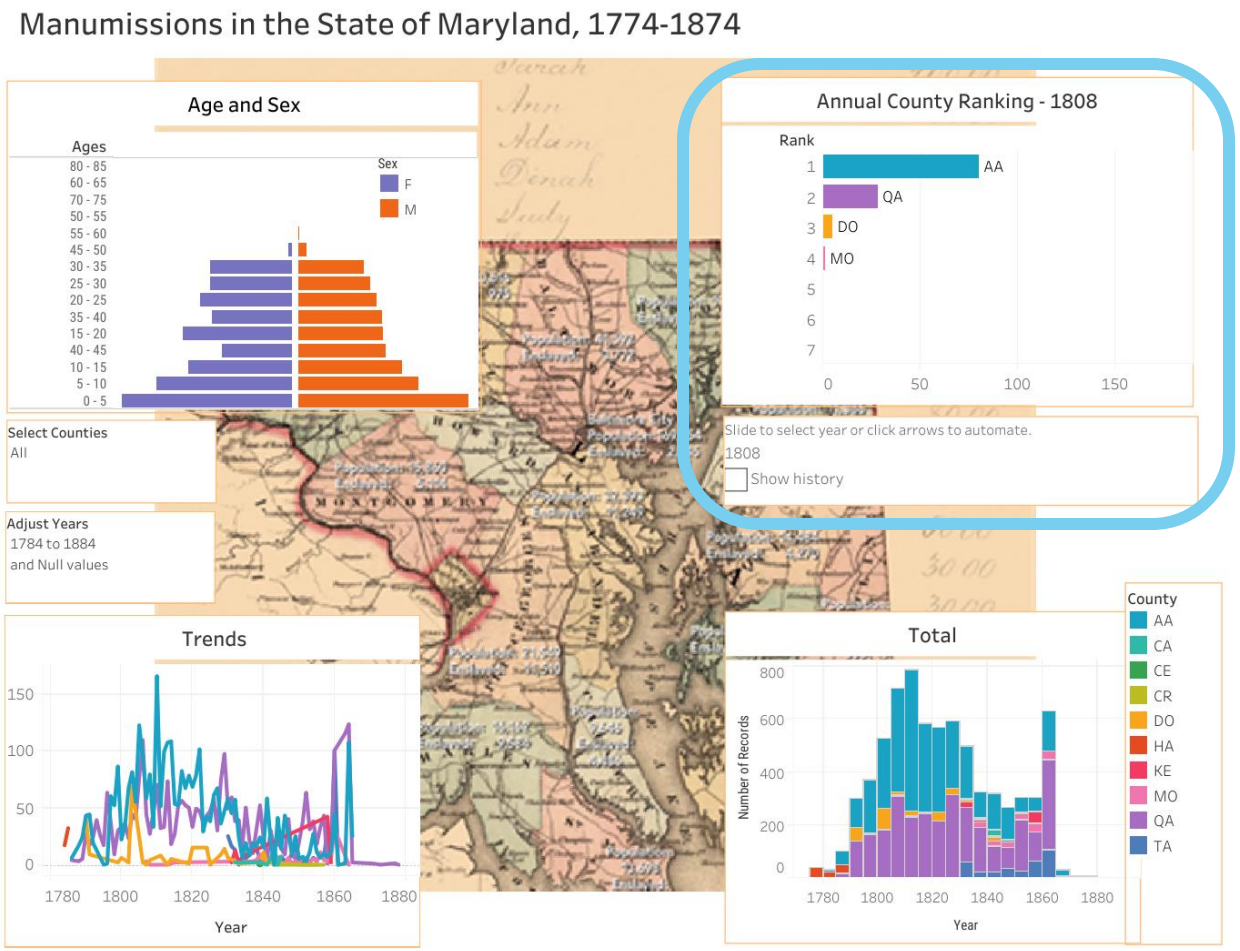
- **Dynamic ranking plot** of the number of manumissions by county.
- **Automated** with values changing in annual increments.
- **Vertical axis** is the counties with the **common color coding**
- **Length of bars** representing the annual number of manumissions in the county.
- Counties are only visible on the vertical axis if data is available for that particular year



Design Element 3: Geographic Focus

Example of Uncovered Knowledge

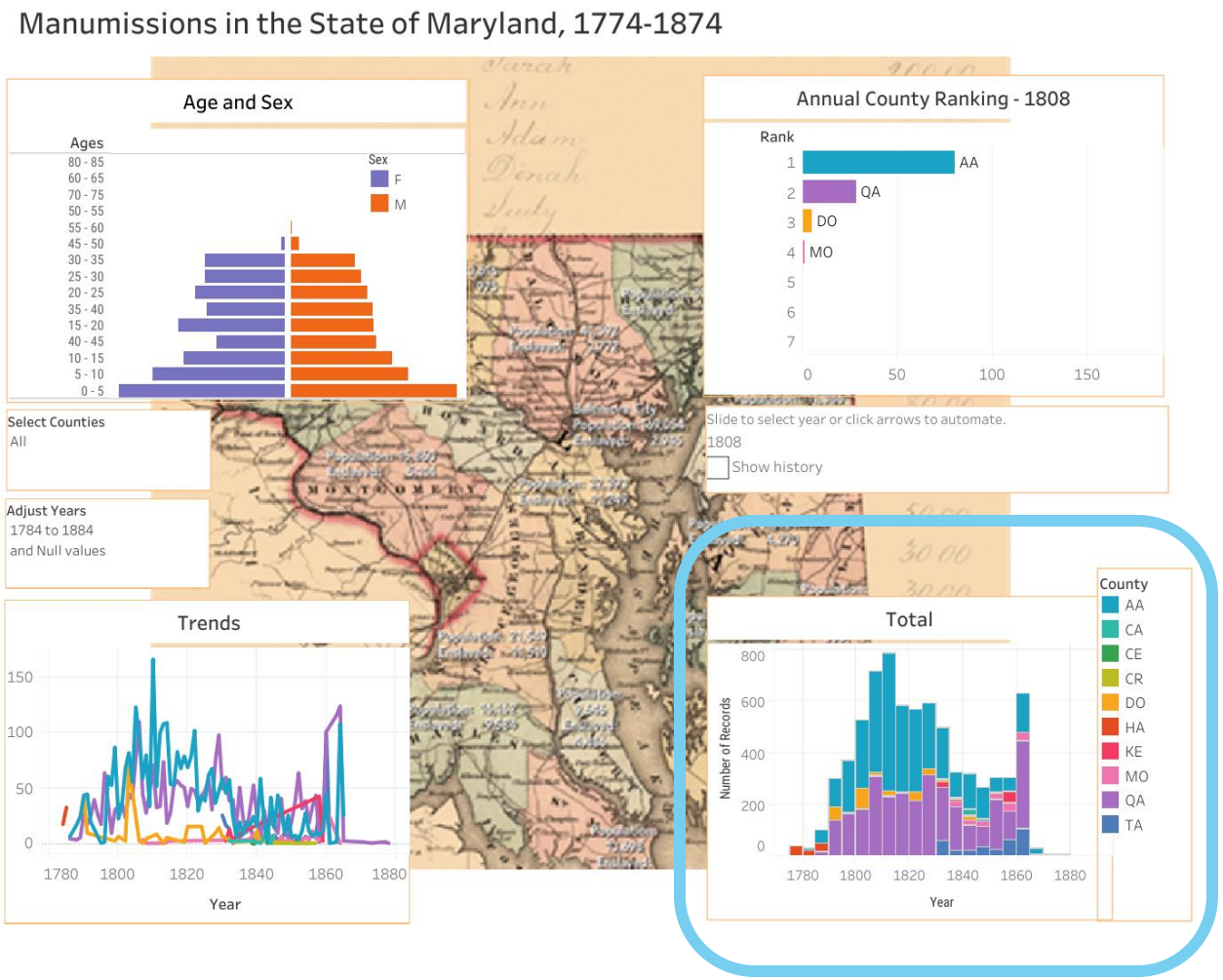
This visualization presents a more granular view of the level of manumissions in counties. Manumissions peaked in different counties at different times. Observing these phenomena invite us to research further the potential temporal drivers and inhibitors for conferring legal freedom.



Design Element 4: The Big Picture

What are years, counties, and number of manumissions records represented in the dataset? What are general trends throughout the period when records are kept?

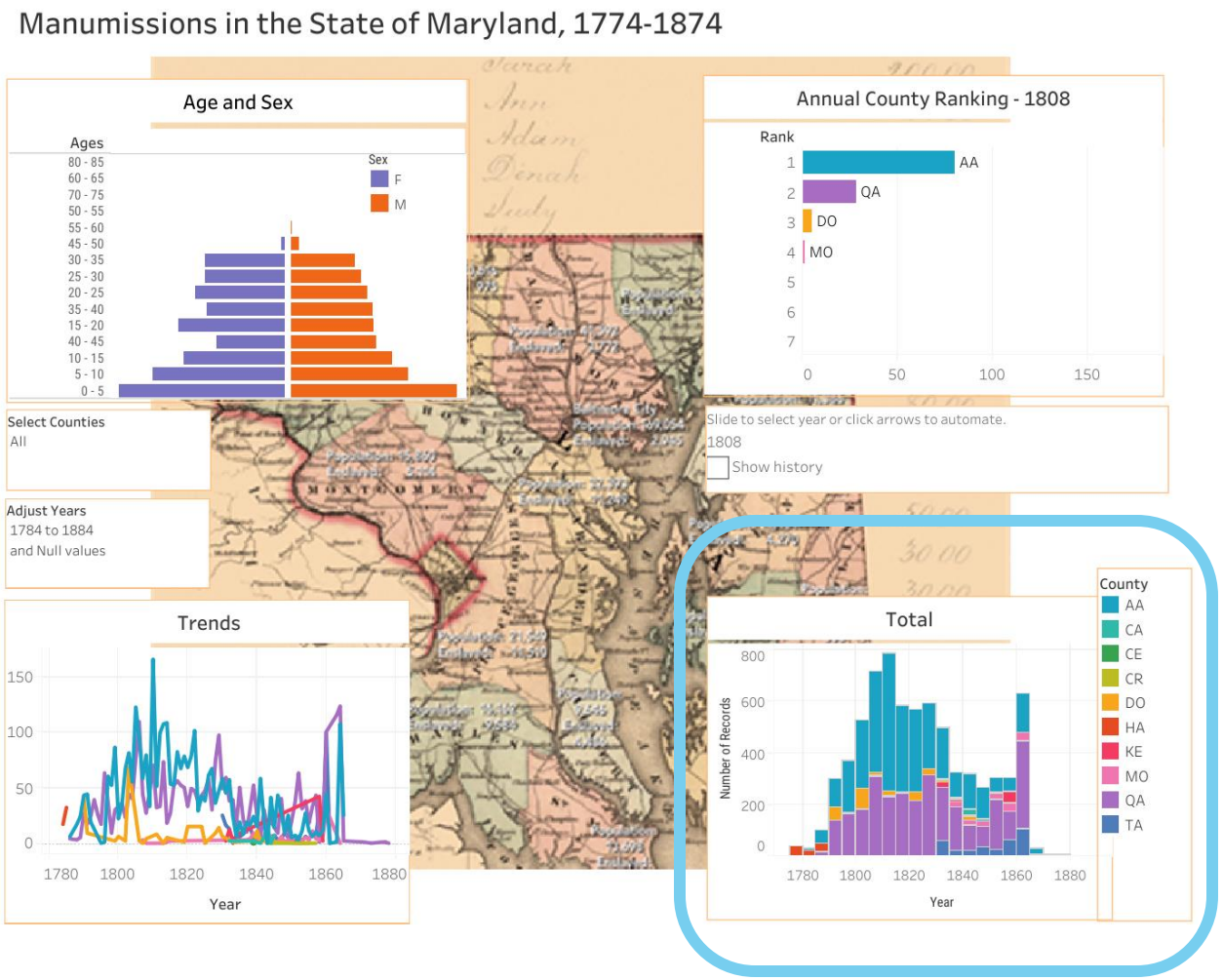
- Classic stacked frequency bar chart provides a **baseline visualization** of the dataset.
- Visualization is **static**, to provide a **backdrop and reference** for the other elements of the dashboard
- **Horizontal axis** represents year in five-year intervals and the height of the bar **(vertical axis)** are total manumissions records.
- **Length of bars** representing the annual number of manumissions in the county.
- The bars are segmented by county, using the **common colors.**



Design Element 4: The Big Picture

Example of Uncovered Knowledge

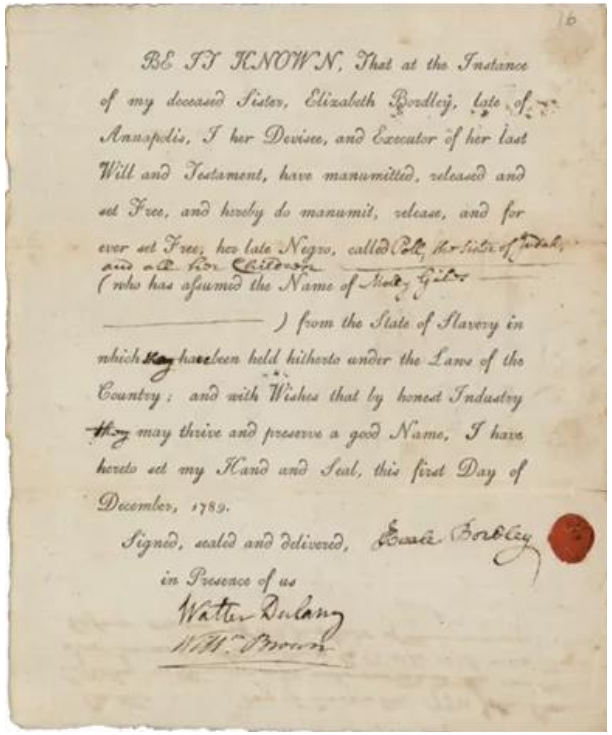
There is a fairly robust pattern of manumissions in Maryland during the first decades of the 19th century, which dropped sharply in the 1830s and stayed at that level until statewide emancipation in 1864. This pattern can be mapped to key historical events in Maryland that first encouraged, then suppressed freedom.



Conclusions/Takeaways

Key Takeaways

- Dynamic and interactive elements help to engage interest and tell a story
- Position of elements aids interaction and engagement
- Variety in elements supports investigation
- Similar information presented with different marks and interactivity can support broader communication
- Static elements and background provide context/reference points
- Color palette is important – colorblind user feedback
- Fewer elements + high interactive = interest + usability


BE IT KNOWN, That at the Instance of my deceased Sister, Elizabeth Bordley, late of Annapolis, I her Devisee, and Executor of her last Will and Testament, have manumitted, released and set Free, and hereby do manumit, release, and for ever set Free, her late Negro, called Pall, the Sister of Isaac, and all her Children (who has assumed the Name of Nicky Gilbert) from the State of Slavery in which they have been held hitherto under the Laws of the Country; and with Wishes that by honest Industry they may thrive and preserve a good Name, I have hereto set my Hand and Seal, this first Day of December, 1789.

Signed, sealed and delivered, Isaac Bordley

in Presence of us

Walter Dulany

Wm. Brown

L. Perine. (Dec. 2020). Historic Black Lives Matter: Visualizing Hidden Heritage in Legacy of Slavery Collections. [Blog] *VisUMD: Visualization at University of Maryland*, Available at: https://medium.com/visumd/historic-black-lives-matter-visualizing-hidden-heritage-in-legacy-of-slavery-collections-23d3266dd0c5

Thank You Questions & Discussion

CONTACT:
PROF. LORI A.PERINE
LPERINE@MONTGOMERYCOLLEGE.EDU
LPERINE@UMD.EDU

Backup Slides

Computational Treatments to Recover Erased Heritage: A Legacy of Slavery Case Study (CT-LoS)

AN INITIAL EXPLORATION OF OPPORTUNITIES AND LIMITATIONS

CT-LoS Project Overview

- Interdisciplinary research presented and published for IEEE Big Data 2020, CAS Workshop #5
- Explore application of computational methods to enhance discovery of histories of marginalized communities .
- Adopt computational thinking for case study conceptualization and implementation
- Address socio-technical context in application of computational treatments.
- Demonstrate experiential, interdisciplinary, team-based learning for information professionals
- Create learning/teaching artifacts
- UMD Collaborators: Dr. Richard Marciano, R.K. Gnanasekaran, P. Nicholas, A. HIll
- Community Partner/Collaborator:

Maryland State Archives

Legacy of Slavery Program

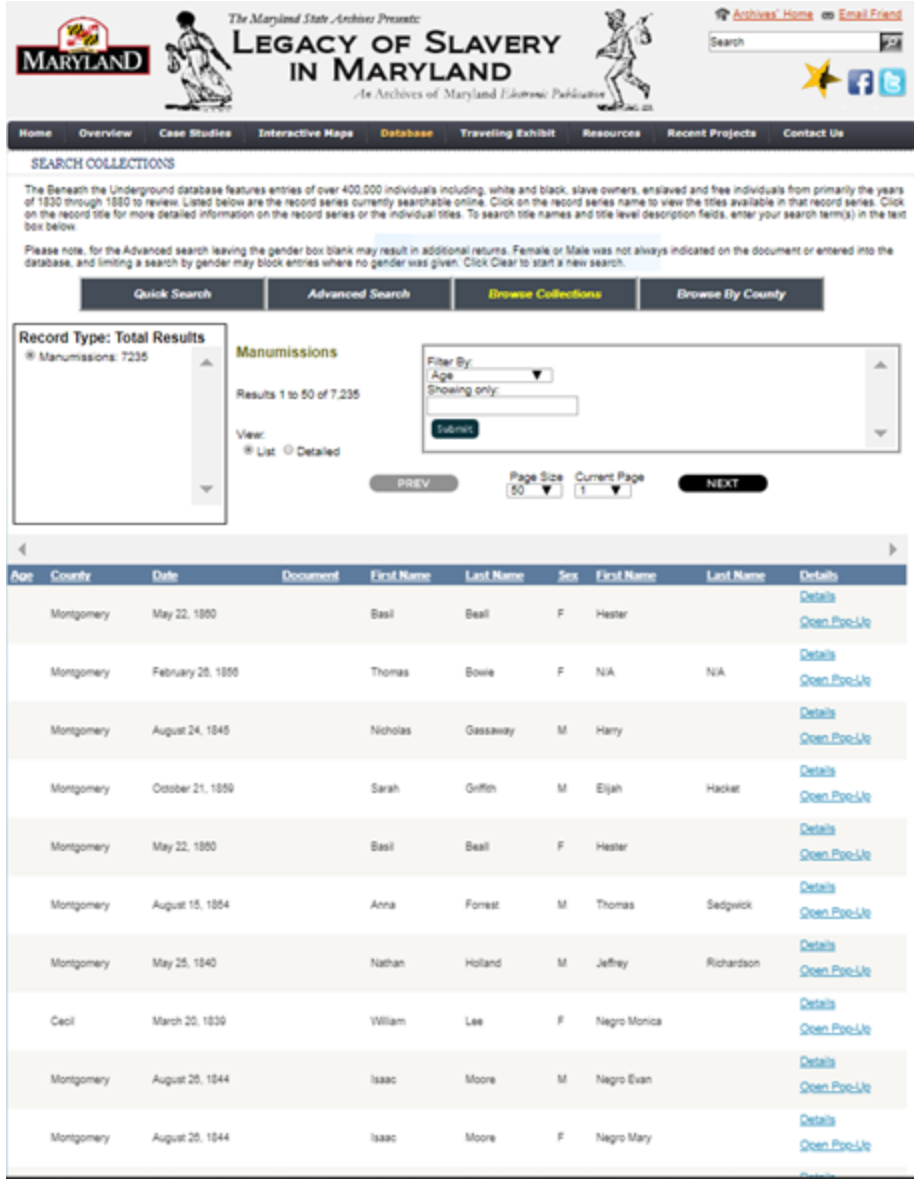
Research Methodology: Exploratory case-study organized around use of primarily open source data analytics tools and methods applied to two datasets from the MSA collections. Dissemination via peer-reviewed paper, presentations, and Jupyter notebooks.

Research Questions	Research Methods
(RQ1) What are the **opportunities and limitations for using computational methods and open source tools** to characterize data encoded within records of enslavement and to discover new patterns and relationships in that data?	Apply computational methods associated with "big data" to information contained within text-based records of archival collections related to slavery.
(RQ2) How does **knowledge of social and cultural systems impact** those opportunities and limitations?	Investigate the socio-cultural context in which the original source artifacts and were created and collected; and second, the socio-technical context for converting those artifacts into digital formats.

Computational Thinking Practices Identified for CT-LoS

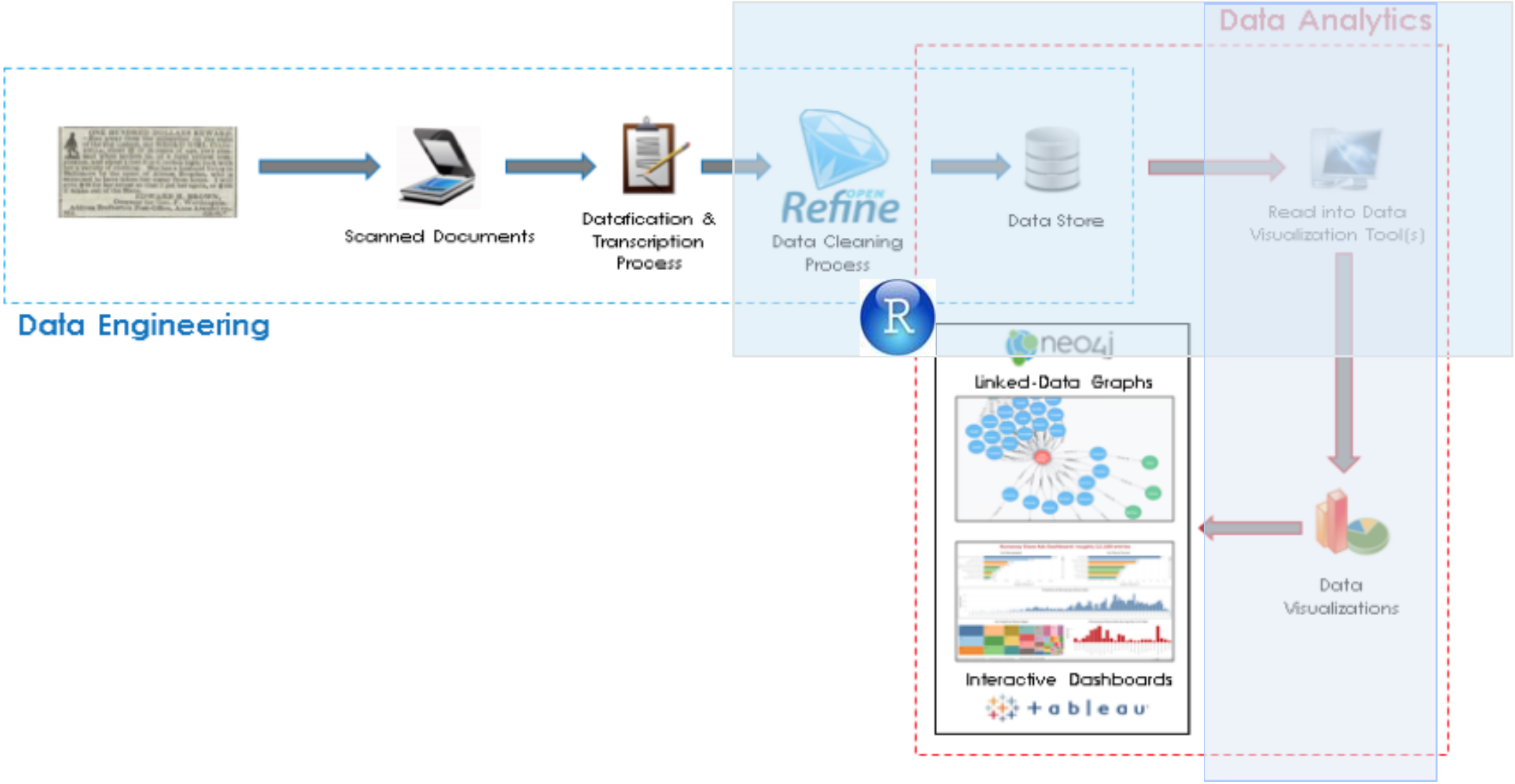
Data Practices	Modeling & Simulation Practices	Computational Problem Solving Practices	Systems Thinking Practices
Collecting Data	Using Computational Models to Understand a Concept	Preparing Problems for Computational Solutions	Investigating a Complex System as a Whole
Creating Data	Using Computational Models to Find and Test Solutions	Programming	Understanding the Relationships within a System
Manipulating Data	Assessing Computational Models	Choosing Effective Computational Tools	Thinking in Levels
Analyzing Data	Designing Computational Models	Assessing Different Approaches/Solutions to a Problem	Communicating Information about a System
Visualizing Data	Constructing Computational Models	Developing Modular Computational Solutions	Defining Systems and Managing Complexity
		Creating Computational Abstractions	
		Troubleshooting and Debugging	

Data Sourcing Methods



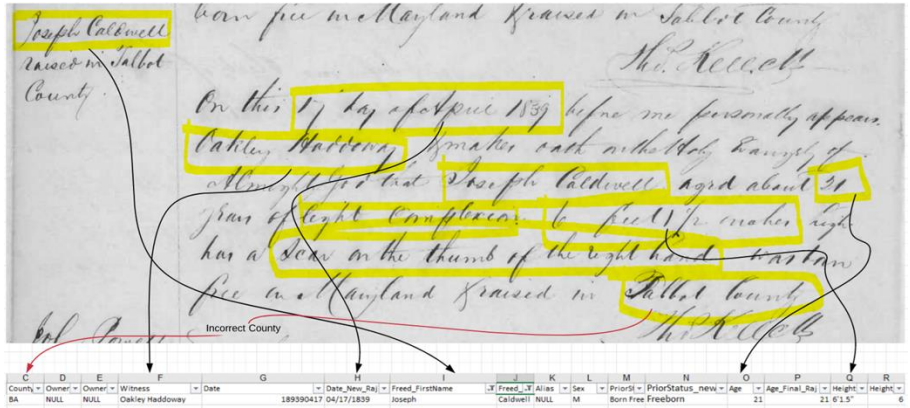
- Direct access to underlying SQL database using webscraping techniques (Python)
- Extraction of primary fields (Python)
- Translation into basic .CSV data tables for easy access (Python to Excel)
- *Data elements may be loss in technical translation, as well*

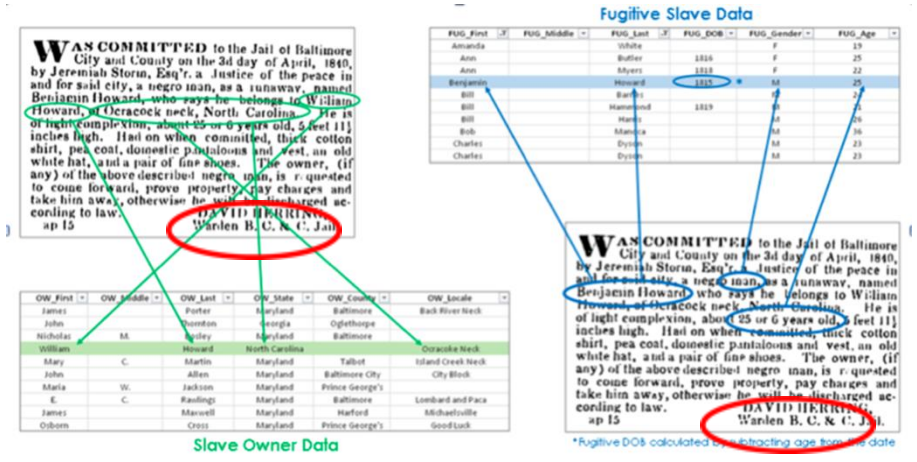
CT-LoS Scope in Work Flow



Data Sourcing Considerations for Computational Exploration

- Relational SQL databases created from original source documents
  - Non-standard primary sources
  - Transcription errors
  - Data entry errors
- Limitations of two dimensional technical tools
- Assumptions regarding definitions of data fields and what/how to “mine” from original documents
- *How well are meaning and relationships captured by the digitized representations? What data elements are lost or ignored? Why? Who decides???*



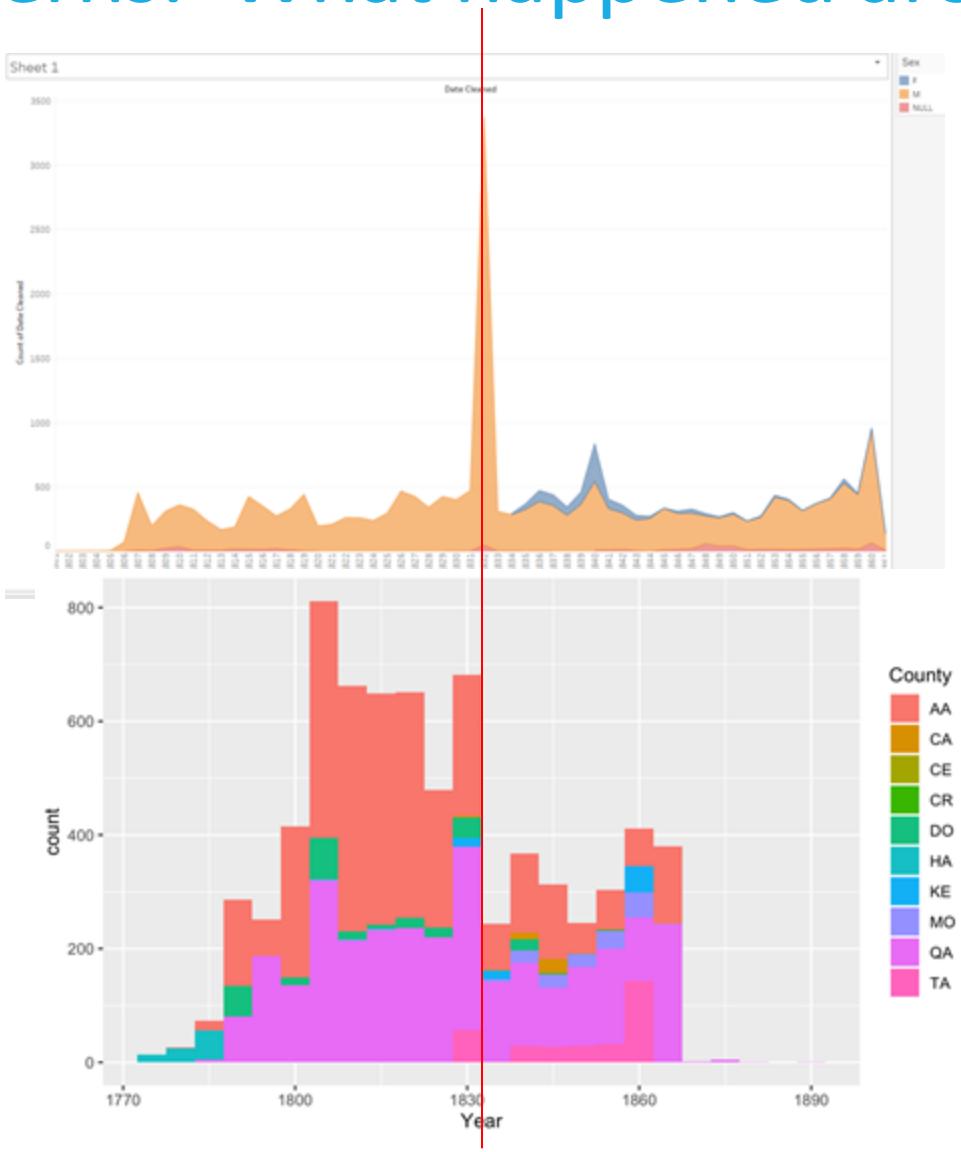


The sociotechnical context for datification of the original sources is an important element of the data exploration.

Data “Biography” Influences Computational Decisions

	Original Documents	Digitization and Datafication	Computational Exploration
Provenance	X	X	X
Legal Context	X		X
Historical Context	X	X	X
Geographic Context	X		X
Transcription/ Translation		X	X
Technology Tools and Methods		X	X
when, what, who, why, how, where			

Identifying Patterns: What happened around 1831/32?



LoS Data Biography: Maryland Historical Context

1642- The first cargo ship with 13 Africans arrives in St. Mary's City. The legal status of indentured servants and slaves in Maryland remains in contention.

1664- Maryland legalizes slavery.

1775- The Revolutionary War begins.

1783- Maryland prohibits the importation of slaves.

1783- The *Maryland Gazette* published "Vox Africanorum", an editorial denouncing the inequality in the newly formed America, which promoted liberty and freedom while enslaving thousands.

1796- The Maryland General Assembly liberalizes the state's manumission laws regarding how and when a slave owner can free his/her slaves.

1831- The Maryland Colonizational Society forms to colonize Maryland blacks in Africa.

1832- In response to the Nat Turner Revolt, Maryland's legislature prohibits free blacks from entering the state.

1857- The U.S. Supreme Court hands down the Dred Scott decision, which denied African Americans equal rights as citizens.

1860- The Maryland General Assembly outlaws manumission by deed or will.

1861- The Civil War begins.

1862- Slavery is abolished in District of Columbia.

1863- Lincoln issues the Emancipation Proclamation, which frees all slaves in the territories currently in rebellion.

1864- On November 1, slavery is abolished in Maryland.

1865- Slavery is abolished in all of the states by the 13th Amendment.