Remembering the Middle Passage

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Data+

"I expected every hour to share the fate of my companions, some of whom were almost daily brought upon deck at the point of death, which I began to hope would soon put an end to my miseries." [1]
-- Olaudah Equiano

Introduction

The trans-Atlantic voyage that conveyed enslaved Africans from Africa to the Americas from the 16th to the 19th century is called **the Middle Passage**. The goal of this project is to explore the mortality rates of enslaved Africans along the Middle Passage, and thus to remember the pain and persecution experienced by the victims of one of the gravest tragedies in human history.

Databases

Trans-Atlantic Slave Trade Database

Includes information on 34,948 slave trade voyages from the mid-16th to mid-19th centuries, but without day-to-day geographical records.

https://www.slavevoyages.org/

The Climatological Database for the World's Oceans (CLIWOC)

Contains detailed geographic coordinates and/or weather events for ships (not only slave ships) from 1750 to 1850.

https://webs.ucm.es/info/cliwoc/

Objectives

Locate where and why enslaved Africans died along the Middle Passage.

Analyze the patterns of these mortality rates from different perspectives, such as how the mortality rate changed over time.

1. Equiano, O. (2012). *The Interesting Narrative of the Life of Olaudah Equiano (1st ed.).* Queensland: Emereo Publishing.

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Methods for Locating Mortality

Merge CLIWOC & Trans-Atlantic databases

For voyages in both databases:

Confirm via historical archives

For voyages only in the Trans-Atlantic Database:

Predict slave ship voyage paths

Differential Equations

Long Short-term Memory (LSTM)

Mortality Location Data Visualizations
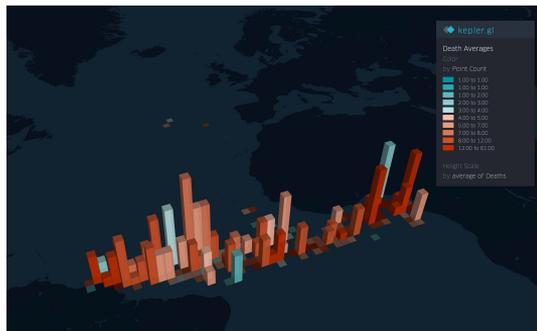
Figure 1: Dutch Slaving Voyages (1751-1795). The height of each bar corresponds to the average number of deaths per $150km^2$ grid. The color of the bar corresponds to the number of ship locations recorded in each grid.
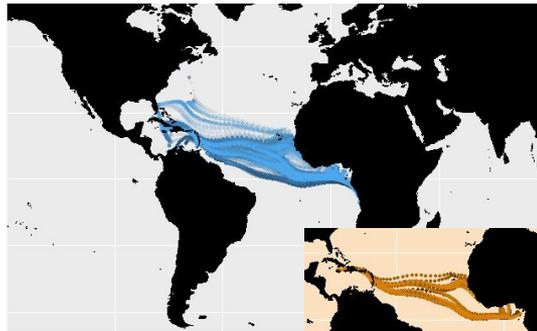

Figure 2(a): Prediction of 2,164 trans-Atlantic voyage paths that ended in the northern hemisphere based on the LSTM model.

Figure 2(b) (bottom-right): Prediction of 36 trans-Atlantic voyage paths based on the LSTM model, all of which have reasonably smooth lines.

Data Visualizations for Mortality Rate Analysis
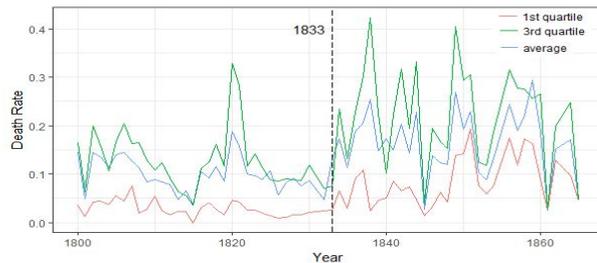
Figure 3: The annual mortality rate from 1800 to 1865. We observed a surprising increase in the mortality rate after 1833, the year that the Slavery Abolition Act was ratified.
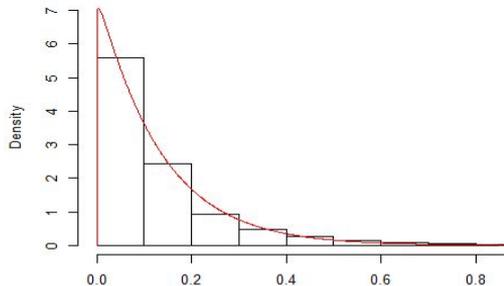
Figure 4: Histogram of the death rate of 6,221 voyages fitted by the gamma distribution (shape = 1.03, rate = 7.93). It shows that 1 in 8 enslaved people died during the Middle Passage.

Conclusions

(a) On average there was a higher mortality rate closer to the embarkation points in Africa.

(b) Some interesting patterns in visualizations result from data imputation; archival confirmation is necessary to this kind of data analysis.

Ethical Challenges

(a) What are the ethical implications of representing individual tragedies with large-scale data visualization?

(b) The databases we use are compiled from ship logs of slave trade companies and journals of captains, who are all exploiters in slave trade history. What are the ethics of reproducing the data they recorded?