

Unveiling the Shadows of History: Exploring the Largest Dataset of Slave Records Online to Quantify the Human Toll of the Americas' Slave Trade Industry

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Data Preparation

```
library(tidyverse)
library(here)
```

Abstract

The trafficking of enslaved Africans stands as a somber chapter in human history, leaving a lasting impact whose repercussions are felt even in contemporary times. The shadows cast by this dark period persist in the socio-cultural fabric of societies around the world. In an effort to shed light on the magnitude of this historical tragedy, our research project embarks on a comprehensive exploration of the largest dataset of slave records available online.

The primary objective of this undertaking is to delve into official documentation, meticulously examining and quantifying the total number of enslaved Africans who endured the harrowing journey across the Atlantic, bound for the Americas' slave trade industry. By leveraging advanced data science methodologies, we aim to unveil the true extent of human suffering and displacement during this epoch.

The enormity of this historical injustice necessitates a rigorous and meticulous approach. Our investigation goes beyond the mere acknowledgment of the existence of enslaved individuals; it strives to provide a quantitative understanding of the scale of this transatlantic atrocity. Through careful analysis and calculation, we seek to offer a comprehensive assessment of the human toll exacted by the Americas' slave trade industry.

As we navigate the vast expanse of historical records, we recognize the responsibility that comes with interpreting the narratives of those who endured unimaginable hardships. This project serves not only as a statistical endeavor but as a testament to the resilience and strength of those whose voices were silenced by the brutality of the slave trade. In quantifying the total number of enslaved Africans, we contribute to a broader understanding of this dark chapter, fostering awareness and acknowledgment of the profound impact it has left on the world we inhabit today.

Cases

That that dataset has 11521 cases, each providing detailed information about the trafficking of enslaved.

Within this dataset, there are 126 variables, offering a comprehensive scope for analysis.

Data collection

The dataset is hosted on the Slave Voyages website, a repository for historical information related to the transatlantic slave trade.

Type of study

This is an observational study. It will analyze data collected from official documents and historical sources organized into a dataset.

Unfortunately, many informations are missing.

Data Source

The data set has been made available by Slave Voyages at the following link

Dependent Variable

Two variables about number of slaves will be used. These variables will give us insights about how was the trafficking transported.

tslavesd: Total slaves on board at departure from last slaving port - numeric variable
slaarrivs: Total slaves arrived at first port of disembarkation - numeric variable

Independent Variable(s)

- **national**: Country in which ship registered - categorical variable
- **portdep**: Port of departure - categorical variable
- **majbuypt**: Principal place of slave purchase - categorical variable
- **majselpt**: Principal port of slave disembarkation - categorical variable
- **yearam**: Year of arrival at port of disembarkation - categorical variable

Relevant summary statistics

Import Dataset

Load the required libraries

```
library(tidyverse)
```

Load the data

```
data <- read.csv('I-Am1.0.csv')  
head(data)
```

```
##   IntraAmer voyageid yearam rig   shipname   captaina plac1tra plac2tra  
## 1         1   161000   1550  NA          Baez, Pedro   39001      NA  
## 2         1   161001   1561  NA          Gomes, Antonio  39001      NA  
## 3         1   161002   1561  NA          Gomes, Antonio  39001      NA  
## 4         1   161003   1563  NA          Gomes, Antonio  39001      NA  
## 5         1   160600   1587  NA NS de Gracia   50599      NA  
## 6         1   160601   1589  NA San Francisco  50599      NA  
##   tslavesd arrport slaipor slaarriv sladvoy vymrtimp tslmtimp vymrtrat slaximp
```

## 1	NA	41210	41210	80	NA	NA	NA	NA	82	
## 2	NA	41211	41211	100	NA	NA	NA	NA	102	
## 3	NA	41211	41211	NA	NA	NA	NA	NA	85	
## 4	NA	41215	41215	60	NA	NA	NA	NA	62	
## 5	NA	42001	42001	60	NA	NA	NA	NA	62	
## 6	NA	42001	42001	5	NA	NA	NA	NA	6	
##	slamimp	fate	fate2	fate3	fate4	sladamer	adpsale1	adpsale2	captainb	placcons
## 1	80	49	1	14	1	NA	NA	NA		NA
## 2	100	49	1	14	1	NA	NA	NA		NA
## 3	83	49	1	14	1	NA	NA	NA		NA
## 4	60	49	1	14	1	NA	NA	NA		NA
## 5	60	7	1	2	3	NA	NA	NA		NA
## 6	5	49	1	14	1	NA	NA	NA		NA
##	placreg	yrcons	yrreg	regarr	regdis1	regdis2	regdis3	regem1	regem2	regisreg
## 1	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 2	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 3	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 4	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 5	NA	NA	NA	42000	42000	NA	NA	50500	NA	NA
## 6	NA	NA	NA	42000	42000	NA	NA	50500	NA	NA
##	constreg	portdep	datedepa	datedepb	datedepc	crew	crew2	crew3	d1slatra	
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 5	NA	42001	NA	NA	NA	NA	NA	NA	NA	
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	
##	d1slatrb	d1slatrc	datarr32	datarr33	datarr34	datarr36	datarr37	datarr38		
## 1	NA	NA	NA	NA	1550	NA	NA	NA		
## 2	NA	NA	NA	NA	1561	NA	NA	NA		
## 3	NA	NA	NA	NA	1561	NA	NA	NA		
## 4	NA	NA	NA	NA	1563	NA	NA	NA		
## 5	NA	NA	8	3	1587	NA	NA	NA		
## 6	NA	NA	28	2	1589	NA	NA	NA		
##	datarr39	datarr40	datarr41	date_buy1	date_leftafr	date_land1	date_land2			
## 1	NA	NA	NA							
## 2	NA	NA	NA							
## 3	NA	NA	NA							
## 4	NA	NA	NA							
## 5	NA	NA	NA							
## 6	NA	NA	NA							
##	date_land3	d1slatra	d1slatrb	d1slatrc	voyage	voy2imp	guns	majbuypt	mjbyptimp	
## 1	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 2	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 3	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 4	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 5	NA	NA	NA	NA	NA	NA	NA	50599	50599	
## 6	NA	NA	NA	NA	NA	NA	NA	50599	50599	
##	majbyimp	majbyimp1	majselpt	mjslptimp	mjselimp	mjselimp1	national	natinimp		
## 1	39000	30000	41210	41210	41200	40000	NA	3		
## 2	39000	30000	41211	41211	41200	40000	4	6		
## 3	39000	30000	41211	41211	41200	40000	4	6		
## 4	39000	30000	41215	41215	41200	40000	4	6		
## 5	50500	50000	42001	42001	42000	40000	1	3		

	50500	50000	42001	42001	42000	40000	4	6
## 6	ncar13	ncar15	npprior				ownera	ownerb ownerc
## 1	NA	NA	NA					
## 2	NA	NA	NA					
## 3	NA	NA	NA					
## 4	NA	NA	NA					
## 5	NA	NA	NA	Vitoria, Francisco de (Bishop of Tucuma				
## 6	NA	NA	NA	Vazquez Pesta\xf1a, Lope				
##	ownerd	ownere	ownerf	ownerg	ownerh	resistance	slas32	slas36 slas39
## 1						NA	NA	NA NA
## 2						NA	NA	NA NA
## 3						NA	NA	NA NA
## 4						NA	NA	NA NA
## 5						NA	NA	NA NA
## 6						NA	NA	NA NA
##		sourcea		sourceb	sourcec	sourced	sourcee	tonnage
## 1	Acosta Saignes, 1961, 5							NA
## 2	Acosta Saignes, 1961, 5		Brito Figueroa, 113					NA
## 3	Acosta Saignes, 1961, 5							NA
## 4	Acosta Saignes, 1961, 5							NA
## 5		Molina, 31						NA
## 6		Molina, 59, 71-72						NA
##	men1	women1	boy1	girl1	infant1	adult1	child1	male1 female1 adlt1imp chill1imp
## 1	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
##	male1imp	feml1imp	slavema1	slavemx1	slavmax1	menrat1	womrat1	boyrat1 girlrat1
## 1	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
##	malrat1	chilrat1	men3	women3	boy3	girl3	infant3	adult3 child3 male3 female3
## 1	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
##	adlt3imp	chil3imp	male3imp	feml3imp	slavema3	slavemx3	slavmax3	menrat3
## 1	NA	NA	NA	NA	NA	NA	NA	NA NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA NA
##	womrat3	boyrat3	girlrat3	malrat3	chilrat3	men7	women7	boy7 girl7 infant7
## 1	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA NA NA NA

```
## 4      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
## 5      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
## 6      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
##      adult7 child7 male7 female7 slavema7 slavemx7 slavmax7 menrat7 womrat7
## 1      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
## 2      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
## 3      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
## 4      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
## 5      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
## 6      NA      NA      NA      NA      NA      NA      NA      NA      NA      NA
##      boyrat7 girlrat7 malrat7 chilrat7 year5 year10 year25 year100 voyageID2
## 1      NA      NA      NA      NA      10      5      2      1500
## 2      NA      NA      NA      NA      13      7      3      1500
## 3      NA      NA      NA      NA      13      7      3      1500
## 4      NA      NA      NA      NA      13      7      3      1500
## 5      NA      NA      NA      NA      18      9      4      1500
## 6      NA      NA      NA      NA      18      9      4      1500
##      AFRINFO Other_Cargo COMMENTS
## 1      NA
## 2      NA
## 3      NA
## 4      NA
## 5      NA
## 6      NA
```

Filtering the data for the slaves disembarked to the Americas

```
library(dplyr)
data_America <- data|> filter(
  (fate2==1)
)
head(data_America)
```

```
##      IntraAmer voyageid yearam rig      shipname      captaina plac1tra plac2tra
## 1           1   161000   1550  NA              Baez, Pedro   39001      NA
## 2           1   161001   1561  NA              Gomes, Antonio   39001      NA
## 3           1   161002   1561  NA              Gomes, Antonio   39001      NA
## 4           1   161003   1563  NA              NS de Gracia   50599      NA
## 5           1   160600   1587  NA San Francisco   50599      NA
## 6           1   160601   1589  NA
##      tslavesd arrport slaipor slaarriv sladvoy vymrtimp tslmtimp vymrtrat slaximp
## 1      NA     41210   41210      80      NA      NA      NA      NA      82
## 2      NA     41211   41211     100      NA      NA      NA      NA     102
## 3      NA     41211   41211      NA      NA      NA      NA      NA      85
## 4      NA     41215   41215      60      NA      NA      NA      NA      62
## 5      NA     42001   42001      60      NA      NA      NA      NA      62
## 6      NA     42001   42001       5      NA      NA      NA      NA       6
##      slamimp fate fate2 fate3 fate4 sladamer adpsale1 adpsale2 captainb placcons
## 1      80     49     1     14     1      NA      NA      NA      NA      NA
## 2     100     49     1     14     1      NA      NA      NA      NA      NA
## 3      83     49     1     14     1      NA      NA      NA      NA      NA
## 4      60     49     1     14     1      NA      NA      NA      NA      NA
```

## 5	60	7	1	2	3	NA	NA	NA	NA	
## 6	5	49	1	14	1	NA	NA	NA	NA	
##	placreg	yrcons	yrreg	regarr	regdis1	regdis2	regdis3	regem1	regem2	regisreg
## 1	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 2	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 3	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 4	NA	NA	NA	41200	41200	NA	NA	39000	NA	NA
## 5	NA	NA	NA	42000	42000	NA	NA	50500	NA	NA
## 6	NA	NA	NA	42000	42000	NA	NA	50500	NA	NA
##	constreg	portdep	datedepa	datedepb	datedepc	crew	crew2	crew3	d1slatra	
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	
## 5	NA	42001	NA	NA	NA	NA	NA	NA	NA	
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	
##	d1slatrb	d1slatrc	datarr32	datarr33	datarr34	datarr36	datarr37	datarr38		
## 1	NA	NA	NA	NA	1550	NA	NA	NA		
## 2	NA	NA	NA	NA	1561	NA	NA	NA		
## 3	NA	NA	NA	NA	1561	NA	NA	NA		
## 4	NA	NA	NA	NA	1563	NA	NA	NA		
## 5	NA	NA	8	3	1587	NA	NA	NA		
## 6	NA	NA	28	2	1589	NA	NA	NA		
##	datarr39	datarr40	datarr41	date_buy1	date_leftafr	date_land1	date_land2			
## 1	NA	NA	NA							
## 2	NA	NA	NA							
## 3	NA	NA	NA							
## 4	NA	NA	NA							
## 5	NA	NA	NA							
## 6	NA	NA	NA							
##	date_land3	d1slatra	d1slatrb	d1slatrc	voyage	voy2imp	guns	majbuypt	mjbyptimp	
## 1	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 2	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 3	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 4	NA	NA	NA	NA	NA	NA	NA	39001	39001	
## 5	NA	NA	NA	NA	NA	NA	NA	50599	50599	
## 6	NA	NA	NA	NA	NA	NA	NA	50599	50599	
##	majbyimp	majbyimp1	majselpt	mjslptimp	mjselimp	mjselimp1	national	natinimp		
## 1	39000	30000	41210	41210	41200	40000	NA	3		
## 2	39000	30000	41211	41211	41200	40000	4	6		
## 3	39000	30000	41211	41211	41200	40000	4	6		
## 4	39000	30000	41215	41215	41200	40000	4	6		
## 5	50500	50000	42001	42001	42000	40000	1	3		
## 6	50500	50000	42001	42001	42000	40000	4	6		
##	ncar13	ncar15	npprior				ownera	ownerb	ownerc	
## 1	NA	NA	NA							
## 2	NA	NA	NA							
## 3	NA	NA	NA							
## 4	NA	NA	NA							
## 5	NA	NA	NA	Vitoria, Francisco de (Bishop of Tucuma						
## 6	NA	NA	NA	Vazquez Pesta\xf1a, Lope						
##	ownerd	ownere	ownerf	ownerg	ownerh	resistance	slas32	slas36	slas39	
## 1						NA	NA	NA	NA	
## 2						NA	NA	NA	NA	

## 3						NA	NA	NA	NA		
## 4						NA	NA	NA	NA		
## 5						NA	NA	NA	NA		
## 6						NA	NA	NA	NA		
##			sourcea			sourceb	sourcec	sourced	sourcee	tonnage	
## 1	Acosta Saignes, 1961, 5										NA
## 2	Acosta Saignes, 1961, 5	Brito Figueroa, 113									NA
## 3	Acosta Saignes, 1961, 5										NA
## 4	Acosta Saignes, 1961, 5										NA
## 5	Molina, 31										NA
## 6	Molina, 59, 71-72										NA
##	men1	women1	boy1	girl1	infant1	adult1	child1	male1	female1	adlt1imp	chill1imp
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
##	male1imp	feml1imp	slavema1	slavemx1	slavmax1	menrat1	womrat1	boyrat1	girlrat1		
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
##	malrat1	chilrat1	men3	women3	boy3	girl3	infant3	adult3	child3	male3	female3
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
##	adlt3imp	chil3imp	male3imp	feml3imp	slavema3	slavemx3	slavmax3	menrat3			
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
##	womrat3	boyrat3	girlrat3	malrat3	chilrat3	men7	women7	boy7	girl7	infant7	
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
##	adult7	child7	male7	female7	slavema7	slavemx7	slavmax7	menrat7	womrat7		
## 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
## 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
##	boyrat7	girlrat7	malrat7	chilrat7	year5	year10	year25	year100	voyageID2		

```
## 1      NA      NA      NA      NA      10      5      2      1500
## 2      NA      NA      NA      NA      13      7      3      1500
## 3      NA      NA      NA      NA      13      7      3      1500
## 4      NA      NA      NA      NA      13      7      3      1500
## 5      NA      NA      NA      NA      18      9      4      1500
## 6      NA      NA      NA      NA      18      9      4      1500
##  AFRINFO Other_Cargo COMMENTS
## 1      NA
## 2      NA
## 3      NA
## 4      NA
## 5      NA
## 6      NA
```

Find the number of slaves that arrived in the Americas and the number of slaves sold in the Americas.

```
num_slave_arrived <- sum(data_America$slaarriv, na.rm = TRUE)
sprintf("Number of slave arrived in America : %d",num_slave_arrived)
```

```
## [1] "Number of slave arrived in America : 310383"
```

```
slave_sold_America <- data_America|> filter(fate==49)|>
  summarize(
    "Number of unsold slaves in America" = sum(slaarriv, na.rm = TRUE ))
sprintf("The approximated number of slaves sold in America is %d",slave_sold_America$`Number of slaves sold in America`)
```

```
## character(0)
```

```
unslaved<- num_slave_arrived - slave_sold_America
unslaved
```

```
##      Number of unsold slaves in America
## 1                                49330
```

```
#Comments:
#The findings represents that the number of slave arrived in America is 310383 while the approximated number of slaves sold in America is 49330
```

Select the important columns related to slaves characteristics

```
library(dplyr)
newData1 <- data_America[, c('tslavesd','national', 'slaximp','slaarriv','female1','child1', 'female3',
head(newData1)
```

```
##      tslavesd national slaximp slaarriv female1 child1 female3 child3 female7
## 1      NA      NA      82      80      NA      NA      NA      NA      NA
## 2      NA      4      102     100      NA      NA      NA      NA      NA
```



```
## 3      NA      4      85      NA      NA      NA      NA      NA      NA
## 4      NA      4      62      60      NA      NA      NA      NA      NA
## 5      NA      1      62      60      NA      NA      NA      NA      NA
## 6      NA      4      6       5      NA      NA      NA      NA      NA
##   child7 adult1 adult3 adult7
## 1      NA      NA      NA      NA
## 2      NA      NA      NA      NA
## 3      NA      NA      NA      NA
## 4      NA      NA      NA      NA
## 5      NA      NA      NA      NA
## 6      NA      NA      NA      NA
```

```
#Cleaned the newdata
newData <- data_America[, c('slaximp','slaarriv')]
head(newData)
```

```
##   slaximp slaarriv
## 1      82      80
## 2     102     100
## 3      85      NA
## 4      62      60
## 5      62      60
## 6       6       5
```

#Comments: In the newdata1, we found that there are 'NA' in tslavesed and female1 and in other variable.

Linear Regression analysis

```
reg<-lm(slaarriv~slaximp, data = data)
summary(reg)
```

```
##
## Call:
## lm(formula = slaarriv ~ slaximp, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -194.833   -0.183   -0.060    0.302    9.358
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.7459020  0.0495274  -15.06  <2e-16 ***
## slaximp      0.9823157  0.0005631 1744.52  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.581 on 7108 degrees of freedom
## (4411 observations deleted due to missingness)
## Multiple R-squared:  0.9977, Adjusted R-squared:  0.9977
## F-statistic: 3.043e+06 on 1 and 7108 DF, p-value: < 2.2e-16
```

#Comments: The findings shows that the p-value of slaximp is <2e-16 that is less than 0.05 so, we can co

Visualization

```
library(ggplot2)
summary_slaves<-newData|>reframe(
  Slave_Status = c("Embarked","Arrived in America"),
  Number_of_Slaves = c(sum(slaximp, na.rm = TRUE), sum(slaarriv, na.rm = TRUE))
)
summary_slaves
```

```
##           Slave_Status Number_of_Slaves
## 1           Embarked         455193
## 2 Arrived in America         310383
```

#Comments: The findings represents that there are total 455193 number of slaves who were initially emba

Visualization

```
require(scales)
```

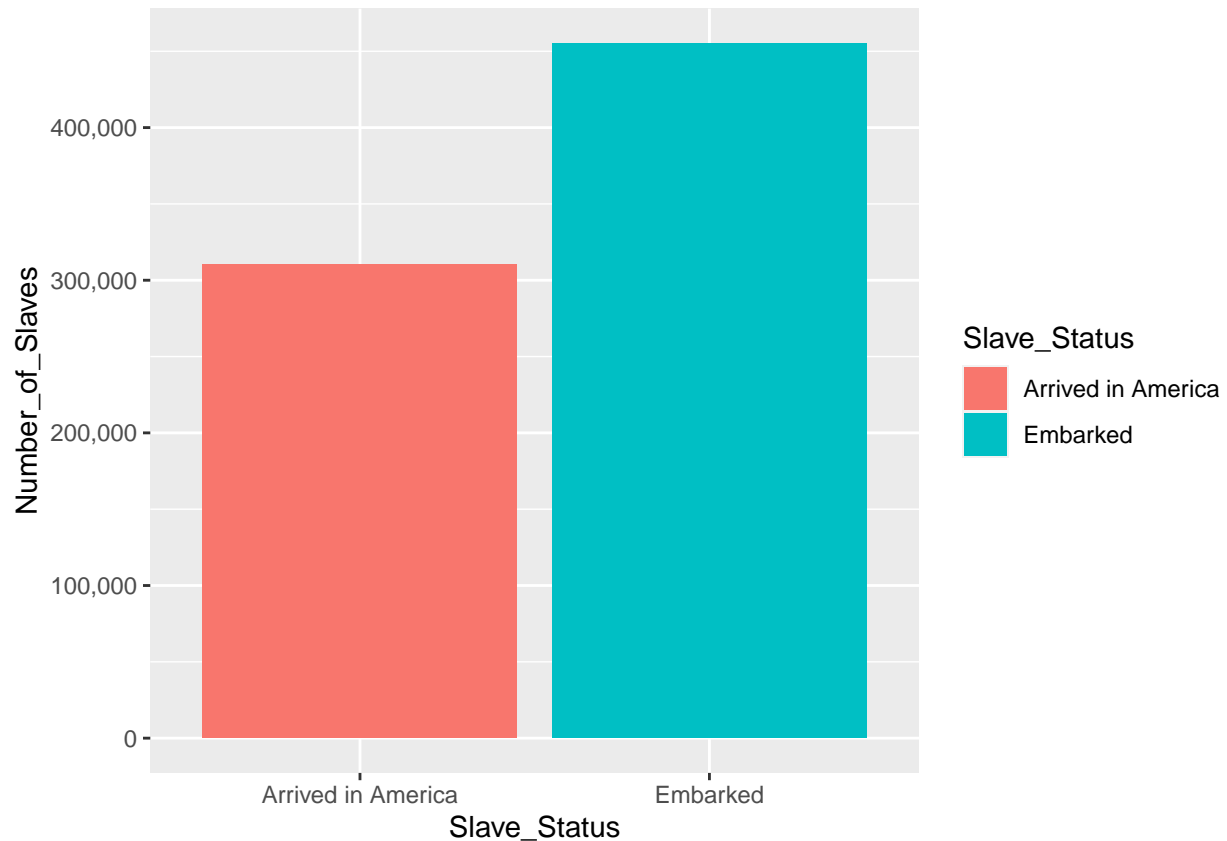
```
## Loading required package: scales
```

```
##
## Attaching package: 'scales'
```

```
## The following object is masked from 'package:purrr':
##
##      discard
```

```
## The following object is masked from 'package:readr':
##
##      col_factor
```

```
ggplot(data = summary_slaves, aes(x=Slave_Status, y=Number_of_Slaves, fill=Slave_Status))+
  geom_col()+
  scale_y_continuous(labels = scales::comma)
```



#Comments: The figure represents that number of slaves are higher in those who were initially embarked

Gender wise slaves and number of children among the slaves.

```
slaves_Gend_dis<-newData1|>reframe(
  Slave_Status = c("Male", "Females","Children"),
  Number_of_Slaves = c( sum(slaarriv, na.rm = TRUE)
    -round((sum(female7, na.rm = TRUE))),
    round(sum(female7, na.rm = TRUE)),
    round(sum(child7, na.rm = TRUE)) )
)
```

```
##   Slave_Status Number_of_Slaves
## 1      Male      292676
## 2   Females      17707
## 3   Children      22706
```

#Comments: The findings revealed that there are 292676 male slaves, 17707 female slaves and 22706 children

Merge country code with country name

```
national <- c(1, 2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 24, 25, 26, 27)
country<- c("Spain", "Uruguay", "Portugal", "Brazil", "Great Britain", "Netherlands", "U.S.A.",
            "France", "Denmark", "Hanse Towns, Brandenburg", "Sweden", "Norway", "Argentina",
            "Russia", "Sardinia", "Mexico", "Genoa", "Duchy of Courland", "Prussia", "Bremen")
countryData <- data.frame(national = national, own_country = country)
head(countryData)
```

```
##   national  own_country
## 1         1         Spain
## 2         2         Uruguay
## 3         4         Portugal
## 4         5         Brazil
## 5         7 Great Britain
## 6         8         Netherlands
```

#Comments: It can be seen that the country code with country name.

Merge ship data with national

```
ships_data<-newData1|> reframe(
  Nation = c("Spain", "Uruguay", "Portugal", "Brazil", "Great Britain", "Netherlands", "U.S.A.",
            "France", "Denmark", "Hanse Towns, Brandenburg", "Sweden", "Norway", "Argentina",
            "Russia", "Sardinia", "Mexico", "Genoa", "Duchy of Courland", "Prussia", "Bremen", 'NA'),
  Number_of-Ships = c(sum(national==1, na.rm = TRUE), sum(national==2, na.rm = TRUE),
                      sum(national==4, na.rm = TRUE), sum(national==5, na.rm = TRUE),
                      sum(national==7, na.rm = TRUE), sum(national==8, na.rm = TRUE),
                      sum(national==9, na.rm = TRUE), sum(national==10, na.rm = TRUE),
                      sum(national==11, na.rm = TRUE), sum(national==12, na.rm = TRUE),
                      sum(national==13, na.rm = TRUE), sum(national==14, na.rm = TRUE),
                      sum(national==16, na.rm = TRUE), sum(national==17, na.rm = TRUE),
                      sum(national==18, na.rm = TRUE), sum(national==19, na.rm = TRUE),
                      sum(national==24, na.rm = TRUE), sum(national==25, na.rm = TRUE),
                      sum(national==26, na.rm = TRUE), sum(national==27, na.rm = TRUE),
                      sum(is.na(national)))
)
ships_data
```

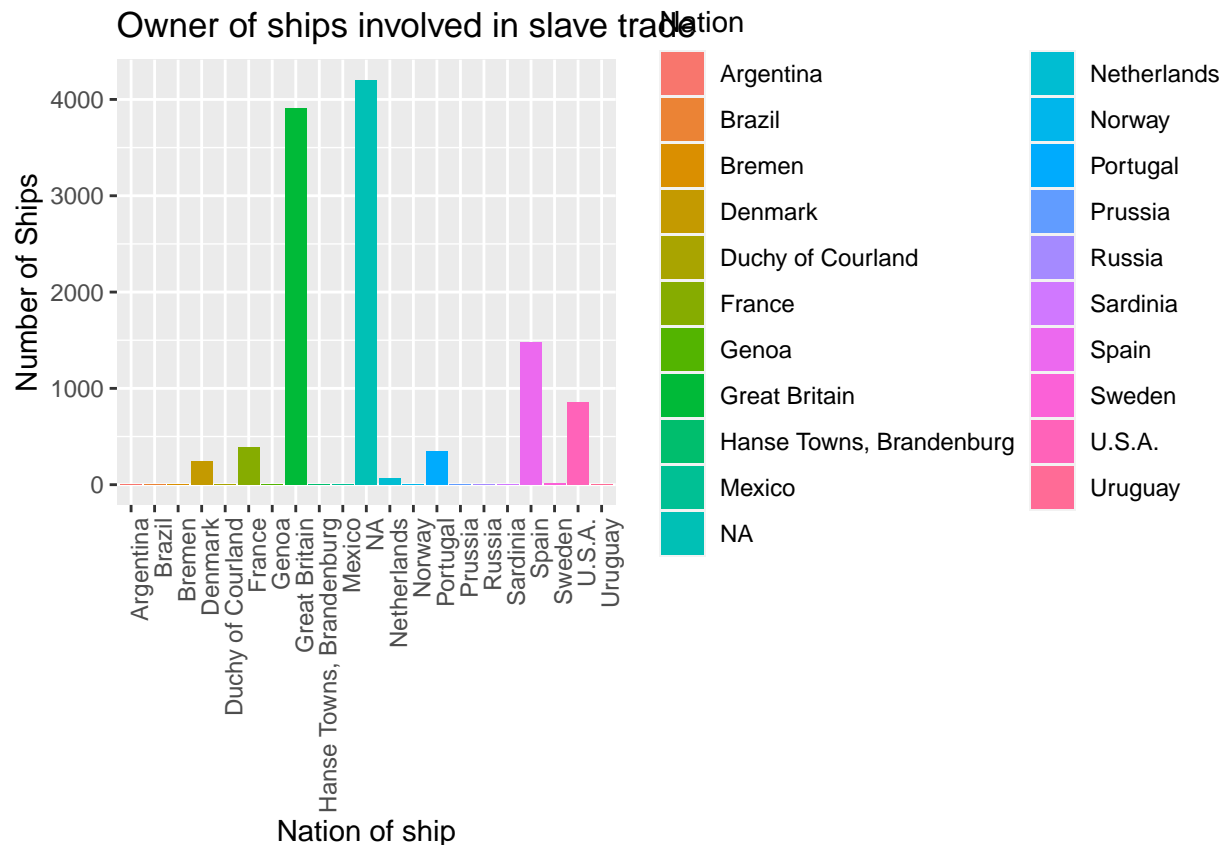
```
##           Nation Number_of-Ships
## 1           Spain           1479
## 2           Uruguay            0
## 3           Portugal           351
## 4           Brazil            0
## 5       Great Britain          3905
## 6         Netherlands            63
## 7             U.S.A.           861
## 8             France           385
```

```
## 9          Denmark          247
## 10 Hanse Towns, Brandenburg    0
## 11          Sweden          15
## 12          Norway           1
## 13          Argentina         0
## 14          Russia           0
## 15          Sardinia          0
## 16          Mexico           0
## 17          Genoa            0
## 18    Duchy of Courland        0
## 19          Prussia           2
## 20          Bremen           1
## 21          NA              4202
```

#Comments: The findings tell that 3905 number of ships trading slaves are registered in the Great Brita

Visualization

```
require(scales)
ggplot(data = ships_data, aes(x=Nation, y= Number_of-Ships, fill=Nation))+
  geom_col()+
  theme(axis.text.x = element_text(angle = 90, hjust=1))+
  labs(title = "Owner of ships involved in slave trade",
       y = "Number of Ships",
       x = "Nation of ship")
```



#Comments: The graph is also representing that Great Britain number of ships are on top carrier of slaves

Ships with slaves captured by the US and Greater Britain, Spain, France. To do this, the following information is useful:

fate =11 => Captured by British (after embarkation of slaves) fate =15 => Captured by Spanish (after embarkation of slaves) fate =51 => Captured by French (after embarkation of slaves) fate =161 => Captured by USA (after embarkation of slaves)

```
data|> group_by(fate)|>
  summarize(
    total_ship = n())|>
  filter(
    fate==11 | fate ==15 | fate == 51 | fate == 161
  )
```

```
## # A tibble: 4 x 2
##   fate total_ship
##   <int>      <int>
## 1    11         4
## 2    15         5
## 3    51         2
## 4   161         4
```

#Comments: It can also be seen that how many Ships with slaves captured by the US and Greater Britain, .

Total number of slaves arrived in America is the total number of slaves in the variable 'slaarriv'

This can be done using the sum() but there are na values in the column 'slaarriv' so we have to use na.rm=TRUE inside sum()

```
num_slave_arrived <- sum(newData$slaarriv, na.rm = TRUE)
sprintf("Number of slaves that arrived in the Americas using the data are %d", num_slave_arrived)
```

```
## [1] "Number of slaves that arrived in the Americas using the data are 310383"
```

#Comments: It can be seen that there are 310383 Number of slaves arrived in America using the data.