

Trabajo final Data Science - Grupo 1

Brechas de ciberseguridad - Estados Unidos

-Ernesto Guarda
-Christian Vadillo
-Cristhian Medina
-Jorge Cabrera
-Royer Rojas

1 Objetivo

El objetivo de esta práctica es realizar un estudio de las brechas de ciberseguridad que se han dado en Estados Unidos entre los años 2000 y 2014.

Luego de presentar la estructura y los trabajos realizados en el dataset se procederá a responder las preguntas que se han planteado con el fin de obtener información para orientarnos a tomar decisiones.

1.1 Librerías utilizadas

Para poder elaborar este script hemos utilizado las siguientes librerías de R:

1. readr
2. dplyr
3. ggplot2
4. tidyverse
5. ggthemes
6. lubridate
7. lattice
8. survival
9. Formula
10. Hmisc
11. rmarkdown
12. knitr

1.2 Dataset

El dataset utilizado se llama “Cyber Security Breaches” y puede ser encontrado dando click [aquí](#)

1.3 Preparación del dataset

Antes de comenzar a trabajar con el dataset ajustaremos los tipos de variables para poder obtener resultados correctos

```

#La variable "State" la convertiremos a tipo factor
cyberb$State <- as.factor(cyberb$State)
#La variable "Type_of_Breach" la convertiremos a tipo factor
cyberb$Type_of_Breach <- as.factor(cyberb$Type_of_Breach)
#La variable "Location_of_Breached_Information" la convertiremos a tipo factor
cyberb$Location_of_Breached_Information <- as.factor(cyberb$Location_of_Breached_Information)
#La variable "Date_Posted_or_Updated" la convertiremos a tipo fecha
cyberb$Date_Posted_or_Updated <- as.Date(cyberb$Date_Posted_or_Updated,format="%d/%m/%Y")
#La variable "breach_start" la convertiremos a tipo fecha
cyberb$breach_start <- as.Date(cyberb$breach_start,format="%d/%m/%Y")
#La variable "breach_end" la convertiremos a tipo fecha
cyberb$breach_end <- as.Date(cyberb$breach_end,format="%d/%m/%Y")

```

1.4 Descripción de las variables del dataset

```

## cyberb
##
## 10 Variables      1055 Observations
## -----
## Name_of_Covered_Entity
##      n missing distinct
## 1055      0      963
##
## lowest : 101 FAMILY MEDICAL GROUP
## highest: Yale University
## -----
## State
##      n missing distinct
## 1055      0      52
##
## lowest : AK AL AR AZ CA, highest: VT WA WI WV WY
## -----
## Business_Associate_Involved
##      n missing distinct
## 271      784      214
##
## lowest : Accretive Health
## highest: Xand Corporation
## -----
## Individuals_Affected
##      n missing distinct      Info      Mean      Gmd      .05      .10
## 1055      0      809      1      30262      55209      550      629
##      .25      .50      .75      .90      .95
## 1000      2300      6941      20446      55062
##
## lowest :      500      501      502      504      505
## highest: 1220000 1700000 1900000 4029530 4900000
## -----
## Type_of_Breach
##      n missing distinct
## 1055      0      28
##
## lowest : Hacking/IT Incident
##
## highest: Hacking/IT Incident, Other

```

```

## highest: Unauthorized Access/Disclosure, Hacking/IT Incident      Unauthorized Access/Disclosure, I
## -----
## Location_of_Breached_Information
##      n    missing distinct
##    1055         0        41
##
## lowest : Desktop Computer      Desktop Computer
## highest: Other Portable Electronic Device, Other      Other Portable E
## -----
## Date_Posted_or_Updated
##      n    missing  distinct      Info      Mean      Gmd      .05
##    1055         0        43      0.719 2014-02-23      47.55 2014-01-23
##      .10      .25      .50      .75      .90      .95
## 2014-01-23 2014-01-23 2014-01-23 2014-03-24 2014-06-03 2014-06-19
##
## lowest : 2014-01-23 2014-01-24 2014-01-31 2014-02-11 2014-02-12
## highest: 2014-06-19 2014-06-20 2014-06-24 2014-06-27 2014-06-30
## -----
## Summary
##      n    missing distinct
##    142     913      141
##
## lowest :
##
## OCR opened an investigation of the covered entity (CE), Paul G. Klein DPM, after it reported an encry
##
##
##
##
## The covered entity (CE), Medco Health Solutions, mailed letters with incorrect addresses after a prop
##
##
##
##
## highest: Two unencrypted desktop computers containing the electronic protected health information (el
## -----
## breach_start
##      n    missing  distinct      Info      Mean      Gmd      .05
##    1055         0       732        1 2011-12-09      612.9 2009-10-31
##      .10      .25      .50      .75      .90      .95
## 2010-02-17 2010-11-08 2012-01-11 2013-03-07 2013-10-17 2014-01-09
##
## lowest : 1997-01-01 2002-05-06 2003-03-29 2004-04-21 2004-05-01
## highest: 2014-04-19 2014-05-13 2014-05-27 2014-05-30 2014-06-02
## -----
## breach_end
##      n    missing  distinct      Info      Mean      Gmd      .05
##    145     910       121        1 2012-10-28      279.6 2011-11-17
##      .10      .25      .50      .75      .90      .95
## 2011-12-19 2012-04-22 2012-10-29 2013-05-29 2013-08-15 2013-10-03
##
## lowest : 2007-06-14 2011-02-28 2011-08-05 2011-08-18 2011-09-20
## highest: 2013-10-15 2013-10-31 2013-11-06 2013-11-08 2013-11-30

```

1.5 Resumen del dataset

```
## Name_of_Covered_Entity      State      Business_Associate_Involved
## Length:1055                CA          :113      Length:1055
## Class :character            TX          : 83      Class :character
## Mode  :character            FL          : 66      Mode  :character
##                               NY          : 58
##                               IL          : 49
##                               IN          : 40
##                               (Other):646
## Individuals_Affected                Type_of_Breach
## Min.      : 500      Theft                      :516
## 1st Qu.: 1000      Unauthorized Access/Disclosure:150
## Median : 2300      Other                      : 91
## Mean   : 30262      Loss                      : 85
## 3rd Qu.: 6941      Hacking/IT Incident          : 75
## Max.    :4900000      Improper Disposal           : 38
##                               (Other)           :100
##                               Location_of_Breached_Information Date_Posted_or_Updated
## Paper                                :227      Min.      :2014-01-23
## Laptop                              :217      1st Qu.:2014-01-23
## Other                               :116      Median :2014-01-23
## Desktop Computer                    :113      Mean    :2014-02-23
## Network Server                      :107      3rd Qu.:2014-03-24
## Other Portable Electronic Device: 60      Max.    :2014-06-30
## (Other)                             :215
## Summary      breach_start      breach_end
## Length:1055      Min.      :1997-01-01      Min.      :2007-06-14
## Class :character 1st Qu.:2010-11-08      1st Qu.:2012-04-22
## Mode  :character Median :2012-01-11      Median :2012-10-29
##                               Mean  :2011-12-09      Mean  :2012-10-28
##                               3rd Qu.:2013-03-07      3rd Qu.:2013-05-29
##                               Max.   :2014-06-02      Max.   :2013-11-30
##                               NA's    :910
```

2 Preguntas

2.1 ¿Cuáles son los tipos de brechas que afectaron a más personas?

2.2 ¿Cual es el tiempo promedio para superar la brecha?

2.3 ¿Qué tipo de almacenamiento de la información tuvo mas vulnerabilidades?

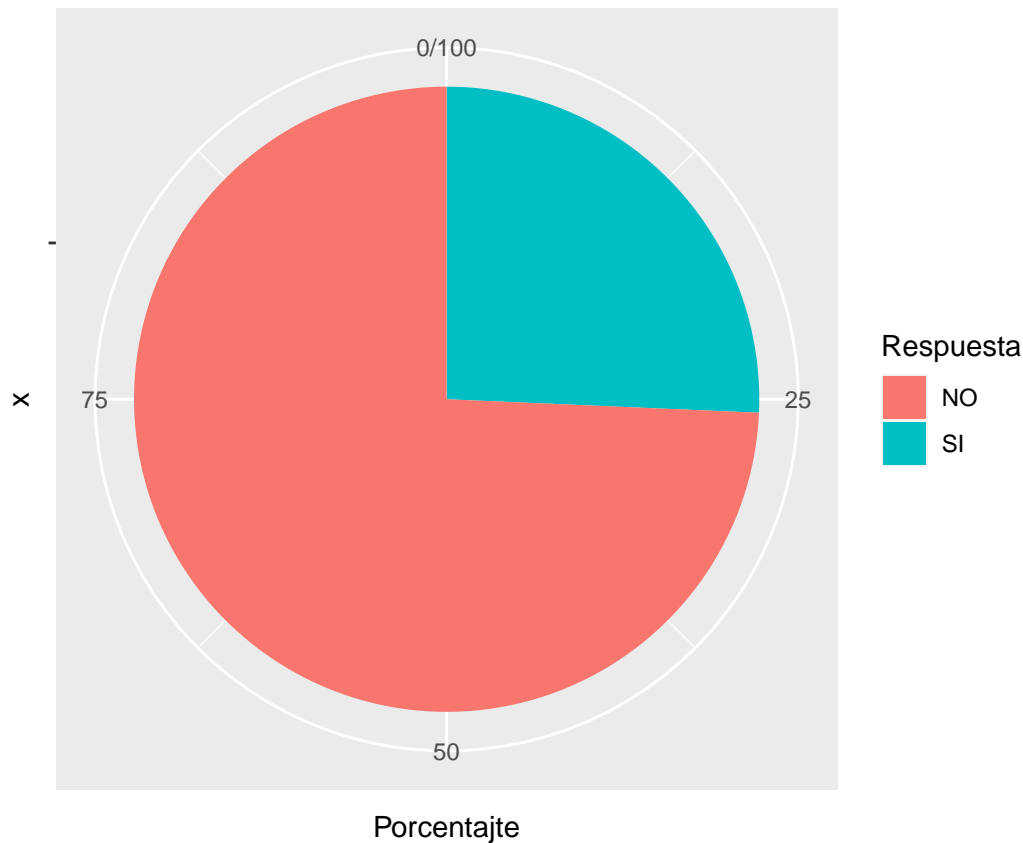
```
##a3 <- cyberb %>%
#   group_by(Location_of_Breached_Information) %>%
#   summarise(count = n())
#a3[,a3[, "count"]<20]
```

2.4 ¿Cuáles son los Estados más atacados?

2.5 ¿Cuántas empresas afectaron a terceros tras un ciberataque?

```
si <- (sum(!is.na(cyberb$Business_Associate_Involved))*100)/length(cyberb$Business_Associate_Involved)
no <- (sum(is.na(cyberb$Business_Associate_Involved))*100)/length(cyberb$Business_Associate_Involved)

a5 <- data.frame(
  Respuesta=c("SI", "NO"),
  Porcentaje=c(si, no)
)
```



2.6 Las 10 empresas que tuvieron la mayor cantidad de afectados

```
a6 <- (data.frame (ID = paste("E", c(1:length(cyberb$Name_of_Covered_Entity))), sep = ""),
  Entidad = cyberb$Name_of_Covered_Entity,
  Individuos_afectados = trunc((cyberb$Individuals_Affected)/1000))) %>% arrange(desc(
```

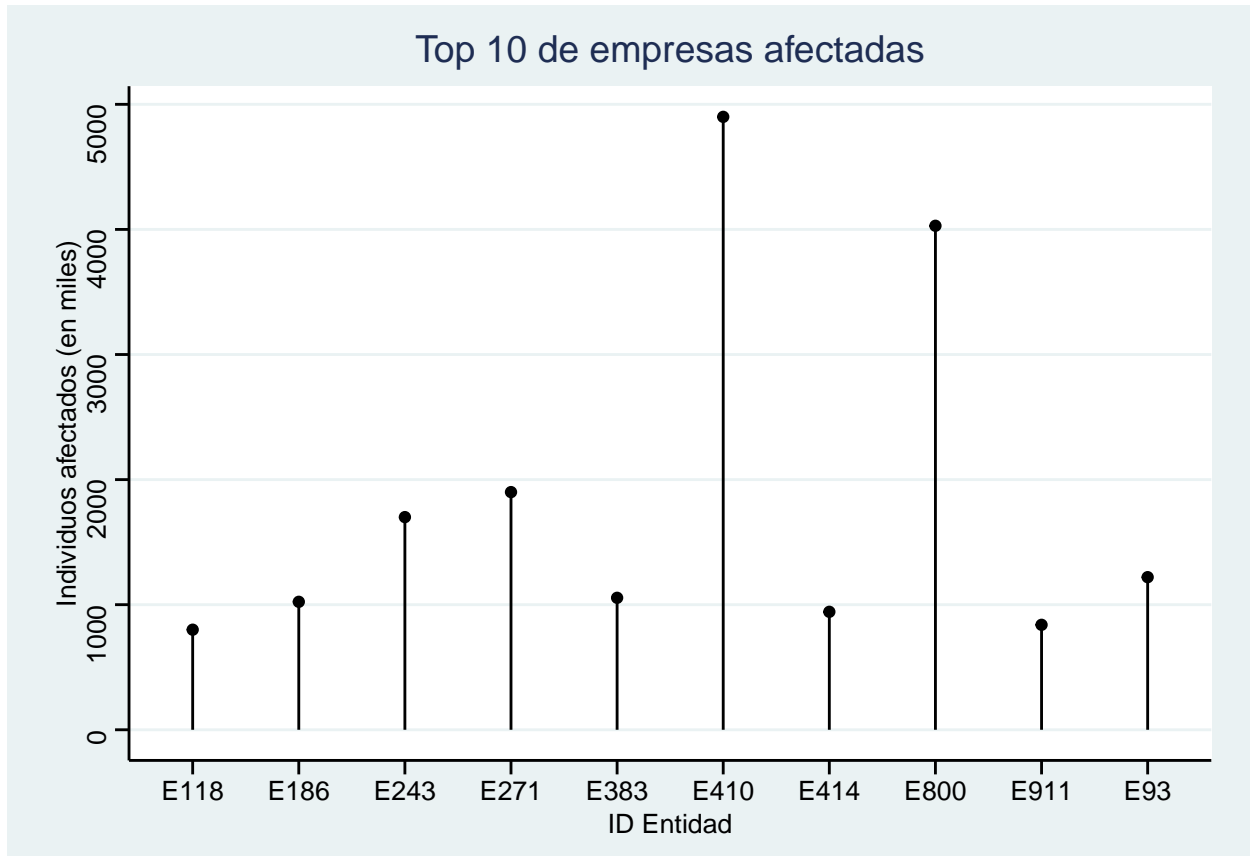


Table 1: Top 5 empresas afectadas

ID	Entidad	Individuos_ afectados
E410	TRICARE Management Activity (TMA)	4900
E800	Advocate Health and Hospitals Corporation, d/b/a Advocate Medical Group	4029
E271	Health Net, Inc.	1900
E243	New York City Health & Hospitals Corporation's North Bronx Healthcare Network	1700
E93	AvMed, Inc.	1220
E383	The Nemours Foundation	1055
E186	BlueCross BlueShield of Tennessee, Inc.	1023
E414	Sutter Medical Foundation	943
E911	Horizon Healthcare Services, Inc., doing business as Horizon Blue Cross Blue Shield of New Jersey, and its affiliates	839
E118	South Shore Hospital	800