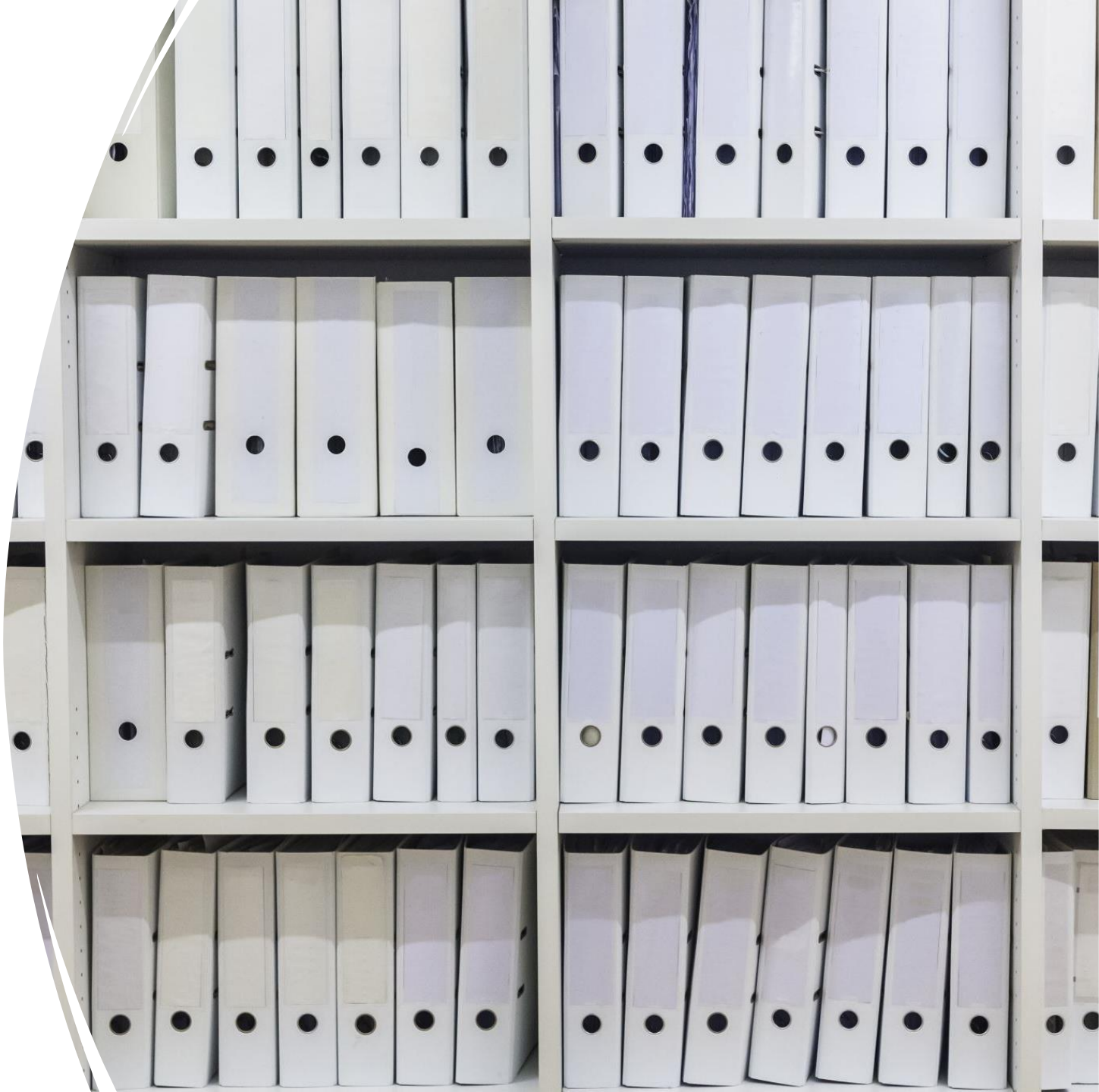
Manejo de Archivos

Herramientas computacionales: el arte de la analítica

Semana Tec



Base de datos a utilizar (Dataset)

- Historical data for bike sharing in London 'Powered by TfL Open Data'
  - https://www.kaggle.com/datasets/hmavrodiev/london-bike-sharing-dataset/data

Metadata:

"timestamp" - *timestamp field for grouping the data*

"cnt" - *the count of a new bike shares*

"t1" - *real temperature in C*

"t2" - *temperature in C "feels like"*

"hum" - *humidity in percentage*

"wind_speed" - *wind speed in km/h*

"weather_code" - *category of the weather*

"is_holiday" - *boolean field - 1 holiday / 0 non holiday*

"is_weekend" - *boolean field - 1 if the day is weekend*

"season" - *category field meteorological seasons: 0-spring ; 1-summer; 2-fall; 3-winter.*

"weathe_code" category description:

1 = Clear ; mostly clear but have some values with haze/fog/patches of fog/ fog in vicinity 2 = scattered clouds / few clouds 3 = Broken clouds 4 = Cloudy 7 = Rain/ light Rain shower/ Light rain 10 = rain with thunderstorm 26 = snowfall 94 = Freezing Fog

Lectura de archivos CSV

- CSV (Comma Separated Values)
- Se le debe de indicar en dónde está el archivo (en qué carpeta)
  - Si no se le dice, asume que está en la misma carpeta en la que está trabajando RStudio

csvFiles.R | data | Estudiando R.R*

Source on Save

```r

# Abrir archivo CSV ------------------

getwd()
setwd("/Users/dr.jorge/Desktop")
getwd()
data = read.csv("./london_merged.csv")
View(data)
```

Filter

	timestamp	cnt	t1	t2	hum	wind_speed	weather_code	is_holiday	is_weekend	season
1	2015-01-04 00:00:00	182	3.0	2.0	93.0	6.0	3	0	1	3
2	2015-01-04 01:00:00	138	3.0	2.5	93.0	5.0	1	0	1	3
3	2015-01-04 02:00:00	134	2.5	2.5	96.5	0.0	1	0	1	3
4	2015-01-04 03:00:00	72	2.0	2.0	100.0	0.0	1	0	1	3
5	2015-01-04 04:00:00	47	2.0	0.0	93.0	6.5	1	0	1	3
6	2015-01-04 05:00:00	46	2.0	2.0	93.0	4.0	1	0	1	3
7	2015-01-04 06:00:00	51	1.0	-1.0	100.0	7.0	4	0	1	3
8	2015-01-04 07:00:00	75	1.0	-1.0	100.0	7.0	4	0	1	3
9	2015-01-04 08:00:00	131	1.5	-1.0	96.5	8.0	4	0	1	3
10	2015-01-04 09:00:00	301	2.0	-0.5	100.0	9.0	3	0	1	3
11	2015-01-04 10:00:00	528	3.0	-0.5	93.0	12.0	3	0	1	3
12	2015-01-04 11:00:00	727	2.0	-1.5	100.0	12.0	3	0	1	3
13	2015-01-04 12:00:00	862	2.0	-1.5	96.5	13.0	4	0	1	3
14	2015-01-04 13:00:00	916	3.0	-0.5	87.0	15.0	3	0	1	3
15	2015-01-04 14:00:00	1039	2.5	0.0	90.0	8.0	3	0	1	3
16	2015-01-04 15:00:00	869	2.0	-1.5	93.0	11.0	3	0	1	3
17	2015-01-04 16:00:00	737	3.0	0.0	93.0	12.0	3	0	1	3

Showing 1 to 17 of 17,414 entries, 10 total columns

Operaciones sobre los datos

- Se pueden realizar las mismas operaciones que con los vectores

- Tan solo se debe de indicar el nombre de la columna (característica) que se desea analizar

csvFiles.R | data | Estudiando R.R*

Source on Save

```r
# Operaciones sobre datos leidos ---

mean(data$wind_speed)
max(data$cnt)
unique(data$weather_code)
```

15:1 # Operaciones sobre datos leidos

Console | Terminal | Background Jobs

R 4.3.3 · ~/Desktop/

```
> mean(data$wind_speed)
[1] 15.91306
> max(data$cnt)
[1] 7860
> unique(data$weather_code)
[1]  3  1  4  7  2 26 10
>
```

Misma función sobre varias columnas

- *apply(x, margen, funcion)*
  - x corresponde a los datos
  - margen
    - 1 sobre los renglones
    - 2 sobre las columnas
    - c(1,2) sobre renglones y columnas
  - funcion indica cuál función aplicar a los datos

csvFiles.R* | data | Estudiando R.R*

Source on Save

```r
# Apply ----------------------------------------

apply(data[,2:5],2,var)
apply(data[,7:10],2,unique)

```

20:1 Apply

Console | Terminal | Background Jobs

R 4.3.3 · ~/Desktop/

```
> apply(data[,2:5],2,var)
         cnt           t1           t2          hum
1.177460e+06 3.104515e+01 4.376014e+01 2.048673e+02
> apply(data[,7:10],2,unique)
$weather_code
[1]  3  1  4  7  2 26 10

$is_holiday
[1] 0 1

$is_weekend
[1] 1 0

$season
[1] 3 0 1 2

>
```

Preparación de los datos

Base de datos a utilizar (Dataset)

Rain in Australia

Predict next-day rain in Australia

Data Card | Code (644) | Discussion (21) | Suggestions (0)

About Dataset

Context

Predict **next-day rain** by training classification models on the target variable **RainTomorrow**.

Content

This dataset contains about 10 years of daily weather observations from many locations across Australia.

RainTomorrow is the target variable to predict. It means -- did it rain the next day, Yes or No? This column is Yes if the rain for that day was 1mm or more.

Source & Acknowledgements

Observations were drawn from numerous weather stations. The daily observations are available from http://www.bom.gov.au/climate/data. An example of latest weather observations in Canberra: http://www.bom.gov.au/climate/dwo/IDCJDW2801.latest.shtml

Definitions adapted from http://www.bom.gov.au/climate/dwo/IDCJDW0000.shtml Data source: http://www.bom.gov.au/climate/dwo/ and http://www.bom.gov.au/climate/data.

Usability
10.00

License
Other (specified in description)

Expected update frequency
Never

Tags

- Earth and Nature
- Classification
- Binary Classification
- Weather and Climate

- Rain in Australia: Predict next-day rain in Australia
  - https://www.kaggle.com/datasets/jsphyg/weather-dataset-rattle-package

Valores nulos

- Representados como NA
- No aportan al análisis de los datos

csvFiles.R* × rainData × data × Estudiando R.R* ×

Filter

	Date	Location	MinTemp	MaxTemp	Rainfall	Evaporation	Sunshine	WindGustDir	WindGustSpeed
1	2008-12-01	Albury	13.4	22.9	0.6	NA	NA	W	44
2	2008-12-02	Albury	7.4	25.1	0.0	NA	NA	WNW	44
3	2008-12-03	Albury	12.9	25.7	0.0	NA	NA	WSW	46
4	2008-12-04	Albury	9.2	28.0	0.0	NA	NA	NE	24
5	2008-12-05	Albury	17.5	32.3	1.0	NA	NA	W	41
6	2008-12-06	Albury	14.6	29.7	0.2	NA	NA	WNW	56
7	2008-12-07	Albury	14.3	25.0	0.0	NA	NA	W	50
8	2008-12-08	Albury	7.7	26.7	0.0	NA	NA	W	35
9	2008-12-09	Albury	9.7	31.9	0.0	NA	NA	NNW	80
10	2008-12-10	Albury	13.1	30.1	1.4	NA	NA	W	28
11	2008-12-11	Albury	13.4	30.4	0.0	NA	NA	N	30
12	2008-12-12	Albury	15.9	21.7	2.2	NA	NA	NNE	31
13	2008-12-13	Albury	15.9	18.6	15.6	NA	NA	W	61

Contar datos nulos

- *sapply(X,funcion)*
  - regresa un vector con los resultados de aplicar la *función* a todos los datos *X*

csvFiles.R | rainData | data | Estudiando R.R*

Source on Save | Run | Source

```r
# Datos nulos ------------------------------------------------------------
sum(is.na(rainData$Evaporation))
sum(is.na(rainData$Sunshine))
sapply(rainData,function(x)sum(is.na(x)))
```

32:42 | Datos nulos | R Script

Console | Terminal | Background Jobs

R 4.3.3 · ~/Desktop/

```
> sum(is.na(rainData$Evaporation))
[1] 62790
> sum(is.na(rainData$Sunshine))
[1] 69835
> sapply(rainData,function(x)sum(is.na(x)))
         Date      Location       MinTemp       MaxTemp      Rainfall   Evaporation      Sunshine
            0             0          1485          1261          3261         62790         69835
  WindGustDir WindGustSpeed    WindDir9am    WindDir3pm  WindSpeed9am  WindSpeed3pm   Humidity9am
        10326         10263         10566          4228          1767          3062          2654
  Humidity3pm   Pressure9am   Pressure3pm      Cloud9am      Cloud3pm       Temp9am       Temp3pm
         4507         15065         15028         55888         59358          1767          3609
    RainToday  RainTomorrow
         3261          3267
>
```

Eliminar NA

- Se eliminan los NA de una columna
- Las demás columnas pueden seguir teniendo NA
- Necesario eliminar los NA de cada columna

csvFiles.R | rainData | data | Estudiando R.R*

Source on Save | Run

```r
# Eliminar NA ------------------------------------------------------------

newRData <- rainData[!is.na(rainData$Evaporation), ]
sum(is.na(newRData$Evaporation))
sapply(newRData,function(x)sum(is.na(x)))

newRData <- newRData[!is.na(newRData$Sunshine), ]
sapply(newRData,function(x)sum(is.na(x)))
```

42:1 Eliminar NA

Console | Terminal | Background Jobs

R 4.3.3 · ~/Desktop/

```
> newRData <- rainData[!is.na(rainData$Evaporation), ]
> sum(is.na(newRData$Evaporation))
[1] 0
> sapply(newRData,function(x)sum(is.na(x)))
         Date      Location       MinTemp       MaxTemp      Rainfall   Evaporation
            0             0           658           645           959             0
     Sunshine   WindGustDir WindGustSpeed    WindDir9am    WindDir3pm  WindSpeed9am
        11288          5052          5025          3632          1284           500
 WindSpeed3pm   Humidity9am   Humidity3pm   Pressure9am   Pressure3pm      Cloud9am
          919          1079          2180           930           933         10389
     Cloud3pm       Temp9am       Temp3pm     RainToday  RainTomorrow
        13054           697          1753           959          1320
> newRData <- newRData[!is.na(newRData$Sunshine), ]
> sapply(newRData,function(x)sum(is.na(x)))
         Date      Location       MinTemp       MaxTemp      Rainfall   Evaporation
            0             0           617           589           911             0
     Sunshine   WindGustDir WindGustSpeed    WindDir9am    WindDir3pm  WindSpeed9am
            0          4351          4328          2617           718           215
 WindSpeed3pm   Humidity9am   Humidity3pm   Pressure9am   Pressure3pm      Cloud9am
          432           913          1089           653           660          7052
     Cloud3pm       Temp9am       Temp3pm     RainToday  RainTomorrow
         8581           652           847           911           964
>
```

Crear subconjunto de un dataset

csvFiles.R | rainData | data | Estudiando R.R*

Source on Save

```r

# Subconjunto ------------------------------------

#humedad mayor a 30
summary(rainData$Humidity3pm)
hum50 <- subset(rainData,rainData$Humidity3pm > 30)
summary(hum50$Humidity3pm)

```

49:1 # Subconjunto

Console | Terminal | Background Jobs

R 4.3.3 · ~/Desktop/

```
> summary(rainData$Humidity3pm)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's 
   0.00   37.00   52.00   51.54   66.00  100.00    4507 
> hum50 <- subset(rainData,rainData$Humidity3pm > 30)
> summary(hum50$Humidity3pm)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
  31.00   45.00   57.00   58.05   69.00  100.00 
>
```

Escribir dataset a un CSV

csvFiles.R | rainData | data | Estudiando R.R*

Source on Save

```
49
50 # Escribir a CSV ----------------------------------
51
52 output = data.frame(newRData)
53 write.csv(output,file = "nuevosDatosLluvia.csv")
54
```

54:1 # Escribir a CSV

Console | Terminal | Background Jobs

R 4.3.3 · ~/Desktop/

```
> output = data.frame(newRData)
> write.csv(output,file = "nuevosDatosLluvia.csv")
>
```

Ejercicio integrador

- Utiliza el dataset “Climate Change: Earth Surface Temperature Data”
  - https://www.kaggle.com/datasets/berkeleyearth/climate-change-earth-surface-temperature-data

- Realiza un análisis en R de los datos descargados (utiliza estadísticos y gráficas)

- Entrega
  - Código Fuente
  - Documento PDF con lo siguiente:
    - Discusión de los resultados arrojados en el análisis en R
    - Conclusión
      - Selecciona 3 países y compara cómo han cambiado las temperaturas en esos 3 paises.