

# Reglas de asociación con Titanic

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Preprocesamiento de datos con el dataset titanic.

El hundimiento del Titanic es una de las tragedias marítimas más conocidas de la historia. El 15 de abril de 1912, durante su viaje inaugural, el Titanic se hundió después de chocar contra un iceberg. En el accidente murieron 1502 personas de las 2224 que habían embarcado, incluyendo pasajeros y tripulación. Una de las razones por las que no se encontraron más supervivientes fue la falta de espacio en los barcos salvavidas. Así, aunque la suerte sin duda sonrió a los supervivientes, también resultaron más favorecidos algunos grupos de personas, como las mujeres, los niños y los pasajeros de la clase superior.

**En este problema analizaremos qué tipos de personas tuvieron más probabilidades de sobrevivir. Para ello, aplicaremos extracción de reglas de asociación que nos permitirán conocer las características de los pasajeros sobrevivieron al hundimiento.**

## Lectura y preprocesamiento de los datos

### Carga de datos

Comenzaremos utilizando el fichero *titanic* de Kaggle, donde encontramos los datos de 891 pasajeros y que utilizaremos para extraer reglas.

Para lectura de datos, utilizaremos alguna de las variantes de la función `read`. A continuación, podemos inspeccionar el contenido de la tabla de datos, que se almacena en formato tibble.

```
datos <- read_csv('titanic.csv')
```

```
##
## -- Column specification -----
## cols(
##   PassengerId = col_double(),
##   Survived = col_double(),
##   Pclass = col_double(),
##   Name = col_character(),
##   Sex = col_character(),
##   Age = col_double(),
##   SibSp = col_double(),
##   Parch = col_double(),
##   Ticket = col_character(),
```

```
## Fare = col_double(),
## Cabin = col_character(),
## Embarked = col_character()
## )
```

```
datos
```

```
## # A tibble: 891 x 12
##   PassengerId Survived Pclass Name Sex Age SibSp Parch Ticket Fare Cabin
##   <dbl> <dbl> <dbl> <chr> <chr> <dbl> <dbl> <dbl> <chr> <dbl> <chr>
## 1 1 0 3 Braun~ male 22 1 0 A/5 2~ 7.25 <NA>
## 2 2 1 1 Cumin~ fema~ 38 1 0 PC 17~ 71.3 C85
## 3 3 1 3 Heikk~ fema~ 26 0 0 STON/~ 7.92 <NA>
## 4 4 1 1 Futre~ fema~ 35 1 0 113803 53.1 C123
## 5 5 0 3 Allen~ male 35 0 0 373450 8.05 <NA>
## 6 6 0 3 Moran~ male NA 0 0 330877 8.46 <NA>
## 7 7 0 1 McCar~ male 54 0 0 17463 51.9 E46
## 8 8 0 3 Palss~ male 2 3 1 349909 21.1 <NA>
## 9 9 1 3 Johns~ fema~ 27 0 2 347742 11.1 <NA>
## 10 10 1 2 Nasse~ fema~ 14 1 0 237736 30.1 <NA>
## # ... with 881 more rows, and 1 more variable: Embarked <chr>
```

## Estado de los datos

Podemos identificar los valores perdidos de la tabla utilizando `df_status()`, del paquete `funModeling`.

```
df_status(datos)
```

```
##   variable q_zeros p_zeros q_na p_na q_inf p_inf type unique
## 1 PassengerId 0 0.00 0 0.00 0 0 numeric 891
## 2 Survived 549 61.62 0 0.00 0 0 numeric 2
## 3 Pclass 0 0.00 0 0.00 0 0 numeric 3
## 4 Name 0 0.00 0 0.00 0 0 character 891
## 5 Sex 0 0.00 0 0.00 0 0 character 2
## 6 Age 0 0.00 177 19.87 0 0 numeric 88
## 7 SibSp 608 68.24 0 0.00 0 0 numeric 7
## 8 Parch 678 76.09 0 0.00 0 0 numeric 7
## 9 Ticket 0 0.00 0 0.00 0 0 character 681
## 10 Fare 15 1.68 0 0.00 0 0 numeric 248
## 11 Cabin 0 0.00 687 77.10 0 0 character 147
## 12 Embarked 0 0.00 2 0.22 0 0 character 3
```

Algunas observaciones interesantes:

- Los valores de *PassengerId* y *Name* son únicos
- Existen dos valores diferentes para *Survived*
- No sobrevivieron 549 pasajeros (61.62%)
- Aparecen numerosos valores perdidos (*na*) en las variables *Age* y *Cabin*
- La mayor parte de los atributos son numéricos

## Selección de variables y valores perdidos

Para realizar nuestro análisis no necesitamos todas las variables; nos interesan solamente varias de ellas que *sospechamos* que pueden ser de utilidad:

- **Pclass**: clase del barco en que viajaba el pasajero (1, 2, 3)
- **Age**: edad del pasajero (0, 100)

- Sex: sexo del pasajero (male, female)
- Survived: sobrevivió o no (1, 0)

Por lo tanto, podemos seleccionar solo las que nos interesan:

```
datos_seleccion <- datos %>%
  select(Pclass, Age, Sex, Survived)
datos_seleccion
```

```
## # A tibble: 891 x 4
##   Pclass   Age Sex   Survived
##   <dbl> <dbl> <chr>   <dbl>
## 1     3    22 male       0
## 2     1    38 female     1
## 3     3    26 female     1
## 4     1    35 female     1
## 5     3    35 male       0
## 6     3    NA male       0
## 7     1    54 male       0
## 8     3     2 male       0
## 9     3    27 female     1
## 10    2    14 female     1
## # ... with 881 more rows
```

Podemos obviar las filas que contienen valores perdidos con `drop_na()`. También podrían aplicarse otros procedimientos más sofisticados para tratar con esos valores perdidos (ver paquete `mice`).

```
datos_seleccion <- datos_seleccion %>%
  drop_na()
datos_seleccion
```

```
## # A tibble: 714 x 4
##   Pclass   Age Sex   Survived
##   <dbl> <dbl> <chr>   <dbl>
## 1     3    22 male       0
## 2     1    38 female     1
## 3     3    26 female     1
## 4     1    35 female     1
## 5     3    35 male       0
## 6     1    54 male       0
## 7     3     2 male       0
## 8     3    27 female     1
## 9     2    14 female     1
## 10    3     4 female     1
## # ... with 704 more rows
```

## Recodificación y discretización de variables

Para trabajar con reglas de asociación, necesitamos que las variables del problema sean de tipo cuantitativo. Por lo tanto, necesitamos ajustar los valores de `Pclass`, `Age` y `Survived`.

Para `Pclass`, únicamente vamos a recodificar los valores usando `mutate()` y la instrucción condicional `ifelse()`:

```
# Survived
datos_cuantitativos <- datos_seleccion %>%
  mutate(Survived = ifelse(Survived == 0, "no", "yes"))
```

Para Age y Survived, el procedimiento es similar, usando condicionales más complejos como `case_when()`:

```
# Pclass
datos_cuantitativos <- datos_cuantitativos %>%
  mutate(Pclass = case_when(
    Pclass == 1 ~ '1st',
    Pclass == 2 ~ '2nd',
    Pclass == 3 ~ '3rd')
  )

# Age
datos_cuantitativos <- datos_cuantitativos %>%
  mutate(Age = case_when(
    Age >= 18 ~ 'adult',
    TRUE ~ 'child')
  )

datos_cuantitativos
```

```
## # A tibble: 714 x 4
##   Pclass Age    Sex    Survived
##   <chr> <chr> <chr>   <chr>
## 1 3rd   adult male    no
## 2 1st   adult female yes
## 3 3rd   adult female yes
## 4 1st   adult female yes
## 5 3rd   adult male    no
## 6 1st   adult male    no
## 7 3rd   child male    no
## 8 3rd   adult female yes
## 9 2nd   child female yes
## 10 3rd  child female yes
## # ... with 704 more rows
```

## Transformación a formato transaccional

Para ejecutar el algoritmo Apriori necesitamos convertir nuestra tabla a formato transaccional. En este problema, los ítems serán las características de los individuos expresadas en formato `<atributo=valor>`. Por ejemplo, la transacción correspondiente al primer individuo será:

`<Pclass=3rd>`, `<Age=adult>`, `<Sex=male>`, `<Survived=no>`

Para ello, necesitamos primero pasar todas las columnas a tipo de dato `factor`:

```
datos_cuantitativos <- datos_cuantitativos %>%
  mutate_all(as.factor)
datos_cuantitativos
```

```
## # A tibble: 714 x 4
##   Pclass Age    Sex    Survived
##   <fct> <fct> <fct>   <fct>
## 1 3rd   adult male    no
## 2 1st   adult female yes
## 3 3rd   adult female yes
## 4 1st   adult female yes
## 5 3rd   adult male    no
## 6 1st   adult male    no
```

```
## 7 3rd    child male    no
## 8 3rd    adult female yes
## 9 2nd    child female yes
## 10 3rd   child female yes
## # ... with 704 more rows
```

Y, a continuación, convertir a "transactions" con la función as():

```
datost <- as(datos_cuantitativos, "transactions")
datost
```

```
## transactions in sparse format with
## 714 transactions (rows) and
## 9 items (columns)
```

```
inspect(datost)
```

```
##      items                                     transactionID
## [1] {Pclass=3rd, Age=adult, Sex=male, Survived=no}      1
## [2] {Pclass=1st, Age=adult, Sex=female, Survived=yes}  2
## [3] {Pclass=3rd, Age=adult, Sex=female, Survived=yes}  3
## [4] {Pclass=1st, Age=adult, Sex=female, Survived=yes}  4
## [5] {Pclass=3rd, Age=adult, Sex=male, Survived=no}     5
## [6] {Pclass=1st, Age=adult, Sex=male, Survived=no}     6
## [7] {Pclass=3rd, Age=child, Sex=male, Survived=no}     7
## [8] {Pclass=3rd, Age=adult, Sex=female, Survived=yes}  8
## [9] {Pclass=2nd, Age=child, Sex=female, Survived=yes}  9
## [10] {Pclass=3rd, Age=child, Sex=female, Survived=yes} 10
## [11] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 11
## [12] {Pclass=3rd, Age=adult, Sex=male, Survived=no}    12
## [13] {Pclass=3rd, Age=adult, Sex=male, Survived=no}    13
## [14] {Pclass=3rd, Age=child, Sex=female, Survived=no}  14
## [15] {Pclass=2nd, Age=adult, Sex=female, Survived=yes}  15
## [16] {Pclass=3rd, Age=child, Sex=male, Survived=no}    16
## [17] {Pclass=3rd, Age=adult, Sex=female, Survived=no}  17
## [18] {Pclass=2nd, Age=adult, Sex=male, Survived=no}    18
## [19] {Pclass=2nd, Age=adult, Sex=male, Survived=yes}    19
## [20] {Pclass=3rd, Age=child, Sex=female, Survived=yes}  20
## [21] {Pclass=1st, Age=adult, Sex=male, Survived=yes}    21
## [22] {Pclass=3rd, Age=child, Sex=female, Survived=no}    22
## [23] {Pclass=3rd, Age=adult, Sex=female, Survived=yes}  23
## [24] {Pclass=1st, Age=adult, Sex=male, Survived=no}    24
## [25] {Pclass=1st, Age=adult, Sex=male, Survived=no}    25
## [26] {Pclass=2nd, Age=adult, Sex=male, Survived=no}    26
## [27] {Pclass=1st, Age=adult, Sex=male, Survived=no}    27
## [28] {Pclass=1st, Age=adult, Sex=male, Survived=no}    28
## [29] {Pclass=3rd, Age=adult, Sex=male, Survived=no}    29
## [30] {Pclass=3rd, Age=adult, Sex=female, Survived=no}  30
## [31] {Pclass=3rd, Age=child, Sex=female, Survived=yes}  31
## [32] {Pclass=3rd, Age=adult, Sex=female, Survived=no}  32
## [33] {Pclass=2nd, Age=adult, Sex=female, Survived=no}  33
## [34] {Pclass=2nd, Age=child, Sex=female, Survived=yes}  34
## [35] {Pclass=3rd, Age=adult, Sex=female, Survived=yes}  35
## [36] {Pclass=3rd, Age=adult, Sex=female, Survived=no}  36
## [37] {Pclass=3rd, Age=child, Sex=male, Survived=no}    37
## [38] {Pclass=3rd, Age=adult, Sex=male, Survived=no}    38
```

```

## [39] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 39
## [40] {Pclass=2nd, Age=adult, Sex=female, Survived=yes} 40
## [41] {Pclass=1st, Age=adult, Sex=male, Survived=no} 41
## [42] {Pclass=2nd, Age=adult, Sex=female, Survived=yes} 42
## [43] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 43
## [44] {Pclass=2nd, Age=child, Sex=female, Survived=yes} 44
## [45] {Pclass=3rd, Age=child, Sex=male, Survived=no} 45
## [46] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 46
## [47] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 47
## [48] {Pclass=1st, Age=adult, Sex=male, Survived=no} 48
## [49] {Pclass=3rd, Age=child, Sex=male, Survived=no} 49
## [50] {Pclass=2nd, Age=adult, Sex=female, Survived=yes} 50
## [51] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 51
## [52] {Pclass=3rd, Age=child, Sex=female, Survived=yes} 52
## [53] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 53
## [54] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 54
## [55] {Pclass=3rd, Age=child, Sex=female, Survived=no} 55
## [56] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 56
## [57] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 57
## [58] {Pclass=3rd, Age=adult, Sex=male, Survived=yes} 58
## [59] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 59
## [60] {Pclass=2nd, Age=child, Sex=male, Survived=yes} 60
## [61] {Pclass=3rd, Age=adult, Sex=female, Survived=yes} 61
## [62] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 62
## [63] {Pclass=3rd, Age=adult, Sex=male, Survived=yes} 63
## [64] {Pclass=1st, Age=adult, Sex=male, Survived=no} 64
## [65] {Pclass=2nd, Age=child, Sex=female, Survived=yes} 65
## [66] {Pclass=3rd, Age=adult, Sex=female, Survived=yes} 66
## [67] {Pclass=3rd, Age=child, Sex=male, Survived=no} 67
## [68] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 68
## [69] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 69
## [70] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 70
## [71] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 71
## [72] {Pclass=1st, Age=adult, Sex=male, Survived=no} 72
## [73] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 73
## [74] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 74
## [75] {Pclass=1st, Age=adult, Sex=male, Survived=no} 75
## [76] {Pclass=1st, Age=adult, Sex=male, Survived=yes} 76
## [77] {Pclass=2nd, Age=adult, Sex=female, Survived=yes} 77
## [78] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 78
## [79] {Pclass=3rd, Age=adult, Sex=female, Survived=no} 79
## [80] {Pclass=1st, Age=adult, Sex=male, Survived=no} 80
## [81] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 81
## [82] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 82
## [83] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 83
## [84] {Pclass=3rd, Age=adult, Sex=female, Survived=yes} 84
## [85] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 85
## [86] {Pclass=1st, Age=adult, Sex=male, Survived=no} 86
## [87] {Pclass=3rd, Age=child, Sex=female, Survived=no} 87
## [88] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 88
## [89] {Pclass=3rd, Age=adult, Sex=female, Survived=no} 89
## [90] {Pclass=3rd, Age=child, Sex=female, Survived=no} 90
## [91] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 91
## [92] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 92

```

## [93]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	93
## [94]	{Pclass=1st, Age=adult, Sex=male, Survived=no}	94
## [95]	{Pclass=3rd, Age=child, Sex=female, Survived=no}	95
## [96]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	96
## [97]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	97
## [98]	{Pclass=2nd, Age=adult, Sex=female, Survived=yes}	98
## [99]	{Pclass=1st, Age=adult, Sex=male, Survived=no}	99
## [100]	{Pclass=3rd, Age=child, Sex=male, Survived=yes}	100
## [101]	{Pclass=3rd, Age=adult, Sex=male, Survived=yes}	101
## [102]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	102
## [103]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	103
## [104]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	104
## [105]	{Pclass=3rd, Age=adult, Sex=female, Survived=no}	105
## [106]	{Pclass=2nd, Age=adult, Sex=female, Survived=yes}	106
## [107]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	107
## [108]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	108
## [109]	{Pclass=1st, Age=adult, Sex=female, Survived=yes}	109
## [110]	{Pclass=1st, Age=adult, Sex=male, Survived=no}	110
## [111]	{Pclass=3rd, Age=child, Sex=male, Survived=no}	111
## [112]	{Pclass=1st, Age=adult, Sex=male, Survived=no}	112
## [113]	{Pclass=3rd, Age=adult, Sex=female, Survived=yes}	113
## [114]	{Pclass=3rd, Age=adult, Sex=female, Survived=yes}	114
## [115]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	115
## [116]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	116
## [117]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	117
## [118]	{Pclass=3rd, Age=adult, Sex=male, Survived=yes}	118
## [119]	{Pclass=3rd, Age=child, Sex=female, Survived=no}	119
## [120]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	120
## [121]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	121
## [122]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	122
## [123]	{Pclass=1st, Age=adult, Sex=female, Survived=yes}	123
## [124]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	124
## [125]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	125
## [126]	{Pclass=1st, Age=adult, Sex=male, Survived=no}	126
## [127]	{Pclass=3rd, Age=child, Sex=female, Survived=yes}	127
## [128]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	128
## [129]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	129
## [130]	{Pclass=2nd, Age=adult, Sex=female, Survived=yes}	130
## [131]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	131
## [132]	{Pclass=3rd, Age=child, Sex=male, Survived=no}	132
## [133]	{Pclass=3rd, Age=child, Sex=male, Survived=no}	133
## [134]	{Pclass=3rd, Age=child, Sex=male, Survived=yes}	134
## [135]	{Pclass=3rd, Age=adult, Sex=female, Survived=no}	135
## [136]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	136
## [137]	{Pclass=1st, Age=adult, Sex=male, Survived=no}	137
## [138]	{Pclass=3rd, Age=child, Sex=male, Survived=no}	138
## [139]	{Pclass=3rd, Age=child, Sex=female, Survived=yes}	139
## [140]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	140
## [141]	{Pclass=1st, Age=adult, Sex=male, Survived=no}	141
## [142]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	142
## [143]	{Pclass=1st, Age=adult, Sex=female, Survived=no}	143
## [144]	{Pclass=2nd, Age=adult, Sex=male, Survived=no}	144
## [145]	{Pclass=3rd, Age=adult, Sex=male, Survived=no}	145
## [146]	{Pclass=3rd, Age=child, Sex=male, Survived=no}	146

```

## [147] {Pclass=2nd, Age=child, Sex=male, Survived=yes} 147
## [148] {Pclass=3rd, Age=child, Sex=female, Survived=yes} 148
## [149] {Pclass=1st, Age=adult, Sex=male, Survived=yes} 149
## [150] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 150
## [151] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 151
## [152] {Pclass=2nd, Age=adult, Sex=female, Survived=yes} 152
## [153] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 153
## [154] {Pclass=3rd, Age=adult, Sex=female, Survived=yes} 154
## [155] {Pclass=2nd, Age=child, Sex=male, Survived=yes} 155
## [156] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 156
## [157] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 157
## [158] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 158
## [159] {Pclass=2nd, Age=adult, Sex=female, Survived=no} 159
## [160] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 160
## [161] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 161
## [162] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 162
## [163] {Pclass=3rd, Age=adult, Sex=male, Survived=yes} 163
## [164] {Pclass=3rd, Age=child, Sex=female, Survived=no} 164
## [165] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 165
## [166] {Pclass=3rd, Age=adult, Sex=male, Survived=yes} 166
## [167] {Pclass=3rd, Age=child, Sex=female, Survived=yes} 167
## [168] {Pclass=1st, Age=adult, Sex=male, Survived=yes} 168
## [169] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 169
## [170] {Pclass=2nd, Age=adult, Sex=female, Survived=yes} 170
## [171] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 171
## [172] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 172
## [173] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 173
## [174] {Pclass=3rd, Age=adult, Sex=female, Survived=yes} 174
## [175] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 175
## [176] {Pclass=1st, Age=adult, Sex=female, Survived=yes} 176
## [177] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 177
## [178] {Pclass=3rd, Age=child, Sex=male, Survived=yes} 178
## [179] {Pclass=2nd, Age=adult, Sex=male, Survived=no} 179
## [180] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 180
## [181] {Pclass=1st, Age=adult, Sex=male, Survived=yes} 181
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## [594] {Pclass=3rd, Age=child, Sex=male, Survived=no} 594
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## [606] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 606
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## [608] {Pclass=3rd, Age=adult, Sex=male, Survived=no} 608
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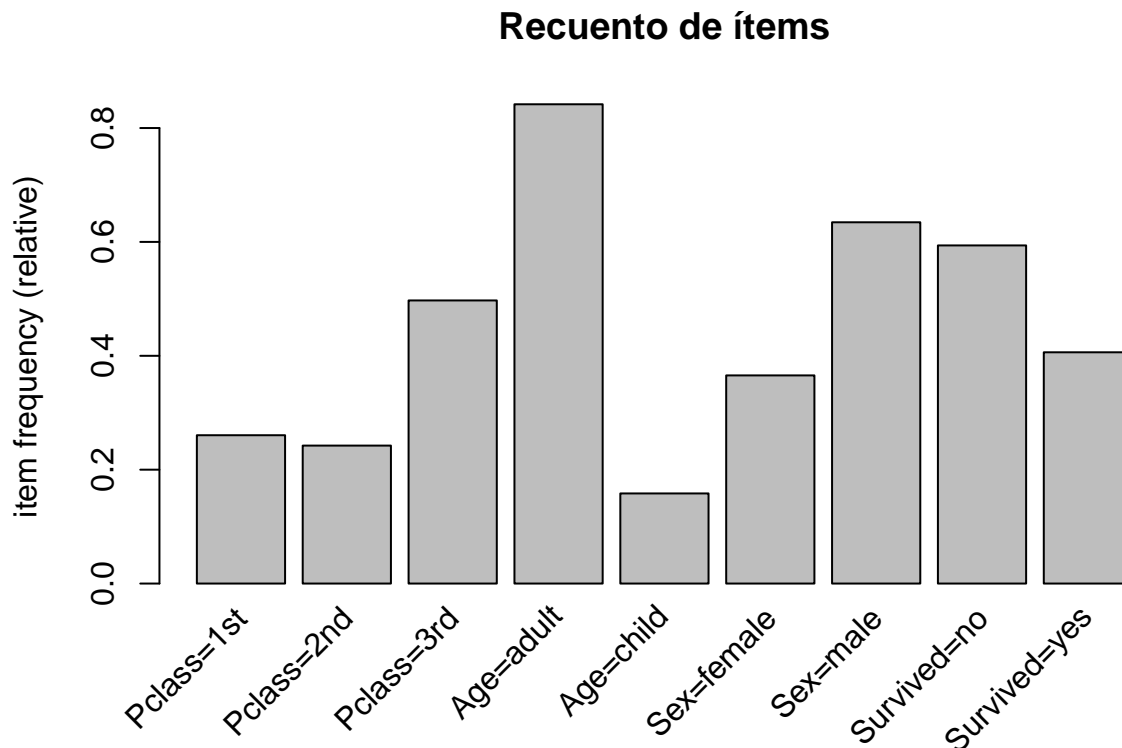
```

```

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## [689] {Pclass=2nd, Age=adult, Sex=male, Survived=no}      689
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## [695] {Pclass=3rd, Age=child, Sex=male, Survived=yes}    695
## [696] {Pclass=3rd, Age=adult, Sex=male, Survived=no}      696
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## [698] {Pclass=1st, Age=adult, Sex=male, Survived=no}      698
## [699] {Pclass=3rd, Age=adult, Sex=male, Survived=no}      699
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## [714] {Pclass=3rd, Age=adult, Sex=male, Survived=no}    714

```

```
itemFrequencyPlot(datost, type="relative", main="Recuento de ítems")
```



## Ejercicios

1. Obtén los itemsets frecuentes de los datos.
2. Ejecuta el proceso de extracción de reglas usando:
  - Soporte: 1%, Confianza: 70%
  - Soporte: 1%, Confianza: 85%
3. Visualiza una selección de las 20 reglas con mayor soporte.
4. Comenta varias reglas obtenidas que te parezcan interesantes en términos de *lift*.
5. Extrae reglas que se refieran solamente a pasajeros adultos. ¿Qué pasaría si, en lugar de aplicar las instrucciones de `cesta.Rmd`, hiciéramos un `filter(Age <= 10)` sobre `datos_cuantitativos` para quitar los pasajeros menores de edad?