



Finanzas en R

Actividad 3

Sebastián Egaña Santibáñez

Nicolás Leiva Díaz

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R y SQL

Veremos un ejemplo simple de conexión entre R y SQL; en este caso utilizamos SQLite.

Librerías y conexión

```
library(RSQLite)
library(dplyr)
```

Se establece la conexión con:

```
con <- dbConnect(SQLite())
```

Escritura de tabla y schema

Escribimos una tabla en base al set de prueba `mtcars`

```
dbWriteTable(con, "mtcars_sql", mtcars)
```

Dos maneras para inspeccionar el schema y las tablas son los siguientes:

```
tables <- dbListTables(con)
```

```
schema <- dbGetQuery(con, "PRAGMA table_info(mtcars_sql)")
```

El primero nos permite ver las tablas en el schema en donde estamos trabajando y el segundo nos permite inspeccionar las características de la tabla especificada. `## Lectura usando SQL`

Una primera manera es utilizar la query relacionada con la conexión de SQL que estamos utilizando:

```
data_01 <- dbGetQuery(con, 'SELECT MPG, CYL FROM mtcars_sql WHERE MPG > 30')
```

```
data_01
```

	mpg	cyl
1	32.4	4
2	30.4	4
3	33.9	4
4	30.4	4

Otra forma es “estorear” la query para después hacer la búsqueda:

```
get_data_02 <- dbSendQuery(con, "SELECT MPG, CYL FROM mtcars_sql WHERE MPG > 30")
```

```
data_02 <- dbFetch(get_data_02)
```

```
data_02
```

	mpg	cyl
1	32.4	4
2	30.4	4
3	33.9	4
4	30.4	4

La otra manera es convertir la tabla de sql a un dataframe en base a dplyr. Después usamos los comandos propios de R para lograr el mismo resultado anterior:

```
tabla_cars <- tbl(con, 'mtcars_sql')
```

Warning: Closing open result set, pending rows

```
tabla_cars %>%  
  select(mpg, cyl) %>%  
  filter(mpg>30) %>%  
  arrange(mpg)
```

```
# Source:      SQL [?? x 2]  
# Database:    sqlite 3.50.1 []  
# Ordered by: mpg  
   mpg    cyl  
<dbl> <dbl>  
1  30.4     4  
2  30.4     4  
3  32.4     4  
4  33.9     4
```

¿Cómo se vería esto en una query? Preguntemosle a R:

```
tabla_cars %>%  
  select(mpg, cyl) %>%  
  filter(mpg>30) %>%  
  arrange(mpg) %>%  
  show_query()
```

```
<SQL>  
SELECT `mpg`, `cyl`  
FROM `mtcars_sql`  
WHERE (`mpg` > 30.0)  
ORDER BY `mpg`
```

Obtener datos financieros

Ejemplo 1

```
# Load necessary libraries
library(quantmod)
library(DBI)
library(RSQLite)

# Define a function to fetch financial data
fetch_financial_data <- function(symbol, start_date, end_date) {
  # Fetch data using quantmod
  data <- getSymbols(symbol, from = start_date, to = end_date, auto.assign = FALSE)
  return(data)
}

# Define your SQLite database file
sqlite_file <- "financial_data.db"

# Connect to SQLite database
conn <- dbConnect(SQLite(), sqlite_file)

# Define the symbol and time frame
symbol <- "AAPL"
start_date <- "2020-01-01"
end_date <- Sys.Date() # Today's date

# Fetch financial data
financial_data <- fetch_financial_data(symbol, start_date, end_date)

# Convert xts object to data frame
financial_data_df <- data.frame(date = index(financial_data), coredata(financial_data))

# Write data to SQLite database
dbWriteTable(conn, "stock_data_01", financial_data_df, overwrite = TRUE)

# Close the database connection

data_financial <- dbGetQuery(conn, 'SELECT * FROM stock_data')

data_financial %>% head()
```

	date	AAPL.Open	AAPL.High	AAPL.Low	AAPL.Close	AAPL.Volume	AAPL.Adjusted
1	18263	74.0600	75.1500	73.7975	75.0875	135480400	73.05943
2	18264	74.2875	75.1450	74.1250	74.3575	146322800	72.34914
3	18267	73.4475	74.9900	73.1875	74.9500	118387200	72.92564
4	18268	74.9600	75.2250	74.3700	74.5975	108872000	72.58267
5	18269	74.2900	76.1100	74.2900	75.7975	132079200	73.75025
6	18270	76.8100	77.6075	76.5500	77.4075	170108400	75.31676

Reflexionemos sobre el paso a paso.

Ejemplo 2

```
# Load necessary libraries
library(quantmod)
library(DBI)
library(RSQLite)

# Define a function to fetch financial data
fetch_financial_data <- function(symbol, start_date, end_date) {
  # Fetch data using quantmod
  data <- getSymbols(symbol, from = start_date, to = end_date, auto.assign = FALSE)
  return(data)
}

# Define your SQLite database file
sqlite_file <- "financial_data.db"

# Connect to SQLite database
conn <- dbConnect(SQLite(), sqlite_file)

# Define the symbol and time frame
symbol <- "AAPL"
start_date <- "2020-01-01"
end_date <- Sys.Date() # Today's date

# Fetch financial data
financial_data <- fetch_financial_data(symbol, start_date, end_date)

# Convert xts object to data frame
financial_data_df <- data.frame(date = index(financial_data), coredata(financial_data))
```

```
# Define SQL command to create table
create_table_sql <- "
CREATE TABLE IF NOT EXISTS stock_data (
  date TEXT PRIMARY KEY,
  open REAL,
  high REAL,
  low REAL,
  close REAL,
  volume REAL,
  adjusted REAL
);
"

# Execute SQL command to create table
dbExecute(conn, create_table_sql)
```

[1] 0

```
# Prepare data for insertion
insert_values_sql <- "INSERT OR REPLACE INTO stock_data VALUES (?, ?, ?, ?, ?, ?, ?)"

# Insert data into table row by row
for (i in 1:nrow(financial_data_df)) {
  row_values <- unname(as.list(financial_data_df[i, ]))
  dbExecute(conn, insert_values_sql, params = row_values)
}

dbWriteTable(conn, "stock_data_02", financial_data_df, overwrite = TRUE)

financial_data_df %>% head()
```

	date	AAPL.Open	AAPL.High	AAPL.Low	AAPL.Close	AAPL.Volume	AAPL.Adjusted
1	2020-01-02	74.0600	75.1500	73.7975	75.0875	135480400	72.62081
2	2020-01-03	74.2875	75.1450	74.1250	74.3575	146322800	71.91481
3	2020-01-06	73.4475	74.9900	73.1875	74.9500	118387200	72.48785
4	2020-01-07	74.9600	75.2250	74.3700	74.5975	108872000	72.14693
5	2020-01-08	74.2900	76.1100	74.2900	75.7975	132079200	73.30753
6	2020-01-09	76.8100	77.6075	76.5500	77.4075	170108400	74.86460

Veamos de nuevo el schema:

```
tables <- dbListTables(conn)
tables
```

```
[1] "stock_data"      "stock_data_01" "stock_data_02"
```

Hacemos un gráfico simple:

```
# Load necessary libraries
library(ggplot2)

# Convert xts object to data frame
financial_data_df <- data.frame(date = index(financial_data), coredata(financial_data))

# Convert date to Date class
financial_data_df$date <- as.Date(financial_data_df$date)

# Plot line chart
ggplot(financial_data_df, aes(x = date)) +
  geom_line(aes(y = AAPL.Close, color = "Close")) +
  geom_line(aes(y = AAPL.Open, color = "Open")) +
  geom_line(aes(y = AAPL.High, color = "High")) +
  geom_line(aes(y = AAPL.Low, color = "Low")) +
  scale_color_manual(values = c("Close" = "blue", "Open" = "red", "High" = "green", "Low" = "purple")) +
  labs(x = "Date", y = "Price", title = "Apple Share Prices") +
  theme_minimal()
```

