

Chunked

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Statistics Netherlands / UseR! 2016

What is chunked?

Short answer:



for data in text files

Process Data in GB-sized Text Files:

(pre)Process text files to:

- select columns
- filter rows
- derive new variables



Save result into:

- Another text file
- A database

Option 1: Read data with R

Use:

- `read.csv` uh, `readr::read_csv`
- `datatable::fread`
- Fast reading of data into memory!

However...

- You will need a lot of RAM!
- Text files tend to be 1 to 100 Gb.
- **Even though these procedures use memory mapping the resulting `data.frame` does not!**
- development cycle of processing script is long...

Option 2: Use unix tools

Good choice!

- sed
- awk
- grep
- fast processing!

However...

It is nice to stay in R-universe (one data-processing tool)

- Instead of learning at least 3 extra tools sed, awk and grep voodoo.
- Does it work on my OS/shell?
- I want to use dplyr verbs! (dplyr-deprivation...)

Option 3: Import data in DB

Import data into DB

- Use DB tool to import data.
- Process database with dplyr.

However

- It is not really a R, but a DB solution
- May be not efficient.

Process in chunks?



Option 4: Use chunked!

Idea:

- Process data chunk by chunk using `dplyr` verbs
 - Memory efficient, only one chunk at a time in memory
 - Lazy processing
 - Development cycle is short: test on first chunk.
-
- Read (and write) on chunk at a time using R package `LaF`.
 - All `dplyr` verbs on `chunk_wise` objects are recorded and replayed when writing.

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Scenario 1: TXT -> TXT

Preprocess a text file with data

```
read_chunkwise("my_data.csv", chunk_size = 5000) %>%  
  select(col1, col2) %>%  
  filter(col1 > 1) %>%  
  mutate(col3 = col1 + 1) %>%  
write_chunkwise("output.csv")
```

This code:

- evals chunk by chunk
- allows for column name completion in Rstudio!

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This code:

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Scenario 2: TXT -> DB

Insert processed text data in DB

```
db <- src_sqlite('test.db', create=TRUE)

tbl <-
  read_chunkwise("./large_file_in.csv") %>%
  select(col1, col2, col5) %>%
  filter(col1 > 10) %>%
  mutate(col6 = col1 + col2) %>%
  write_chunkwise(db, 'my_large_table')
```

Scenario 3: DB -> TXT

Extract a large table from a DB to a text file

```
tbl<-  
  ( src_sqlite("test.db") %>%  
    tbl("my_table")  
  ) %>%  
  read_chunkwise(chunk_size=5000) %>%  
  select(col1, col2, col5) %>%  
  filter(col1 > 10) %>%  
  mutate(col6 = col1 + col2) %>%  
  write_chunkwise('my_large_table.csv')
```

Caveat

Working:

- Working on chunks is memory efficient
- `filter`, `select`,
`rename`, `mutate`, `mutate_each`, `transmute`, `do`, `tbl_vars`,
`inner_join`, `left_join`, `semi_join`, `anti_join` all work ,
also with name completion!

However:

- **`summarize` and `group_by` work chunkwise (and not for all data!)**
- No `arrange`, `right_join`, `full_join`

Thank you!

Interested?

```
install.packages("chunked")
```

Or visit <http://github.com/edwindj/chunked>