

Advanced Data IO

Data Wrangling in R

Google Sheets



gapminder



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A1 country

	A	B	C	D	E	F
1	country	continent	year	lifeExp	pop	gdpPercap
2	Australia	Oceania	1952	69.12	8691212	10039.59564
3	Australia	Oceania	1957	70.33	9712569	10949.64959
4	Australia	Oceania	1962	70.93	10794968	12217.22686
5	Australia	Oceania	1967	71.1	11872264	14526.12465
6	Australia	Oceania	1972	71.93	13177000	16788.62948
7	Australia	Oceania	1977	73.49	14074100	18334.19751
8	Australia	Oceania	1982	74.74	15184200	19477.00928
9	Australia	Oceania	1987	76.32	16257249	21888.88903
10	Australia	Oceania	1992	77.56	17481977	23424.76683
11	Australia	Oceania	1997	78.83	18565243	26997.93657
12	Australia	Oceania	2002	80.37	19546792	30687.75473
13	Australia	Oceania	2007	81.235	20434176	34435.36744
14	New Zealand	Oceania	1952	69.39	1994794	10556.57566
15	New Zealand	Oceania	1957	70.26	2229407	12217.22686



Africa

Americas

Asia

Europe

Oceania



Explore

https://docs.google.com/spreadsheets/d/1U6Cf_qEOhiR9AZqTqS3mbMF3zt2db48ZP5v3rkrAEJY/edit#gid=78

Reading data with the `googlesheets4` package

First, set up Google credentials. This doesn't currently work with AnVIL.

```
library(googlesheets4)
```

```
# Prompts a browser pop-up
gs4_auth()
```

```
# Once set up, you can automate this process by passing your email
gs4_auth(email = "avamariehoffman@gmail.com")
```

Reading data with the `googlesheets4` package

You can also supply an authorization token directly, but make sure to add any files to your `.gitignore`!

```
library(googledrive)
drive_auth(email= "<email>",
           token = readRDS("google-sheets-token.rds")) # Saved in a file
```

Reading data with the `googlesheets4` package

Read in using `read_sheet()`

```
sheet_url <-
  "https://docs.google.com/spreadsheets/d/1U6Cf_qEOhiR9AZqTqs3mbMF3zt2db48ZP5v3rkrAEJY/edit#gid=780868077"
sheet_dat_1 <- read_sheet(sheet_url)
```

Auto-refreshing stale OAuth token.

- ✓ Reading from "gapminder".
- ✓ Range 'Africa'.

```
head(sheet_dat_1)
```

```
# A tibble: 6 × 6
  country continent year lifeExp      pop gdpPerCap
  <chr>    <chr>   <dbl>    <dbl>     <dbl>    <dbl>
1 Algeria Africa     1952     43.1  9279525    2449.
2 Algeria Africa     1957     45.7 10270856    3014.
3 Algeria Africa     1962     48.3 11000948    2551.
4 Algeria Africa     1967     51.4 12760499    3247.
5 Algeria Africa     1972     54.5 14760787    4183.
6 Algeria Africa     1977     58.0 17152804    4910.
```

Reading data with the `googlesheets4` package

Specify the sheet name if necessary:

```
sheet_dat_oceania <- read_sheet(sheet_url, sheet = "Oceania")
```

- ✓ Reading from "gapminder".
- ✓ Range ''Oceania''.

```
head(sheet_dat_oceania)
```

```
# A tibble: 6 × 6
  country continent year lifeExp      pop gdpPercap
  <chr>    <chr>   <dbl>   <dbl>     <dbl>     <dbl>
1 Australia Oceania  1952     69.1 8691212 10040.
2 Australia Oceania  1957     70.3 9712569 10950.
3 Australia Oceania  1962     70.9 10794968 12217.
4 Australia Oceania  1967     71.1 11872264 14526.
5 Australia Oceania  1972     71.9 13177000 16789.
6 Australia Oceania  1977     73.5 14074100 18334.
```

Pull in a subset of data: rows

```
read_sheet(sheet_url, sheet = "Oceania", range = cell_rows(1:4))
```

- ✓ Reading from "gapminder".
- ✓ Range ' 'Oceania'!1:4'.

```
# A tibble: 3 × 6
  country continent year lifeExp      pop gdpPercap
  <chr>     <chr>   <dbl>    <dbl>    <dbl>       <dbl>
1 Australia Oceania    1952     69.1  8691212     10040.
2 Australia Oceania    1957     70.3  9712569     10950.
3 Australia Oceania    1962     70.9 10794968     12217.
```

Pull in a subset of data: columns

```
read_sheet(sheet_url, sheet = "Oceania", range = cell_cols("A:B"))
```

- ✓ Reading from "gapminder".
- ✓ Range ' 'Oceania'!A:B'.

```
# A tibble: 24 × 2
  country    continent
  <chr>      <chr>
1 Australia Oceania
2 Australia Oceania
3 Australia Oceania
4 Australia Oceania
5 Australia Oceania
6 Australia Oceania
7 Australia Oceania
8 Australia Oceania
9 Australia Oceania
10 Australia Oceania
# ... with 14 more rows
```

Reading data with the `googlesheets4` package

List out the sheet names using `sheet_names()`.

```
sheet_names(sheet_url)
```

```
[1] "Africa"    "Americas"  "Asia"       "Europe"     "Oceania"
```

Reading data with the `googlesheets4` package

Iterate through the sheet names:

```
gapminder_sheets <- sheet_names(sheet_url)

data_list <- list()
for(g_sheet in gapminder_sheets) {
  data_list[[g_sheet]] = read_sheet(sheet_url, sheet = g_sheet)
}
```

- ✓ Reading from "gapminder".
- ✓ Range 'Africa'.
- ✓ Reading from "gapminder".
- ✓ Range 'Americas'.
- ✓ Reading from "gapminder".
- ✓ Range 'Asia'.
- ✓ Reading from "gapminder".
- ✓ Range 'Europe'.
- ✓ Reading from "gapminder".

Reading data with the `googlesheets4` package

Iterate through the sheet names:

```
str(data_list)
```

```
List of 5
$ Africa : tibble [624 × 6] (S3:tbl_df/tbl/data.frame)
..$ country : chr [1:624] "Algeria" "Algeria" "Algeria" "Algeria" ...
..$ continent: chr [1:624] "Africa" "Africa" "Africa" "Africa" ...
..$ year     : num [1:624] 1952 1957 1962 1967 1972 ...
..$ lifeExp   : num [1:624] 43.1 45.7 48.3 51.4 54.5 ...
..$ pop       : num [1:624] 9279525 10270856 11000948 12760499 14760787 ...
..$ gdpPercap: num [1:624] 2449 3014 2551 3247 4183 ...
$ Americas: tibble [300 × 6] (S3:tbl_df/tbl/data.frame)
..$ country : chr [1:300] "Argentina" "Argentina" "Argentina" "Argentina" ...
..$ continent: chr [1:300] "Americas" "Americas" "Americas" "Americas" ...
..$ year     : num [1:300] 1952 1957 1962 1967 1972 ...
..$ lifeExp   : num [1:300] 62.5 64.4 65.1 65.6 67.1 ...
..$ pop       : num [1:300] 17876956 19610538 21283783 22934225 24779799 ...
..$ gdpPercap: num [1:300] 5911 6857 7133 8053 9443 ...
$ Asia    : tibble [396 × 6] (S3:tbl_df/tbl/data.frame)
..$ country : chr [1:396] "Afghanistan" "Afghanistan" "Afghanistan" "Afghanistan" ...
..$ continent: chr [1:396] "Asia" "Asia" "Asia" "Asia" ...
..$ year     : num [1:396] 1952 1957 1962 1967 1972 ...
..$ lifeExp   : num [1:396] 28.8 30.3 32 34 36.1 ...
..$ pop       : num [1:396] 8425333 9240934 10267083 11537966 13079460 ...
..$ gdpPercap: num [1:396] 779 821 853 836 740 ...
$ Europe  : tibble [360 × 6] (S3:tbl_df/tbl/data.frame)
..$ country : chr [1:360] "Albania" "Albania" "Albania" "Albania" ...
```

Reading data with the `googlesheets4` package

Pull out sheets as needed:

```
data_list[[{sheet}]]  
# OR  
data_list${sheet}
```

A screenshot of an RStudio session. The code editor shows the following R code:

```
105  
106 data_list$ ← Tibbles stored in the list  
107 ````  
108  
109 ## Reading  
110  
111 Pull out  
112
```

An orange arrow points from the text "Tibbles stored in the list" to the dollar sign (\$) character in the code. A tooltip box with a black border and white background surrounds the text. In the background, a sidebar shows a list of sheet names: Africa, Americas, Asia, Europe, and Oceania, each preceded by a small blue square icon.

Writing data with the `googlesheets4` package

```
sheet_dat_oceania <- data_list$Oceania  
  
sheet_dat_oceania <- sheet_dat_oceania %>%  
  mutate(lifeExp_days = lifeExp * 365)  
  
sheet_out <- gs4_create("Oceania-days",  
                        sheets = list(Oceania_days = sheet_dat_oceania))
```

✓ Creating new Sheet: "Oceania-days".

```
# Opens a browser window  
gs4_browse(sheet_out)
```

Append data with the `googlesheets4` package

```
sheet_append(sheet_out, data = sheet_dat_oceania, sheet = "Oceania_days")
```

- ✓ Writing to "Oceania-days".
- ✓ Appending 24 rows to 'Oceania_days'.

JHU Tidyverse Book

<https://jhubdatascience.org/tidyversecourse/get-data.html#google-sheets>

googlesheets Lab
<http://sisbid.github.io/Data-Wrangling/labs/advanced-io-lab.Rmd>

JSON: JavaScript Object Notation

Lists of stuff

Example [\[edit\]](#)

The following example shows a possible JSON representation describing a person.

```
{  
    "firstName": "John",  
    "lastName": "Smith",  
    "isAlive": true,  
    "age": 27,  
    "address": {  
        "streetAddress": "21 2nd Street",  
        "city": "New York",  
        "state": "NY",  
        "postalCode": "10021-3100"  
    },  
    "phoneNumbers": [  
        {  
            "type": "home",  
            "number": "212 555-1234"  
        },  
        {  
            "type": "office",  
            "number": "646 555-4567"  
        }  
    ],  
    "children": [],  
    "spouse": null  
}
```

Why JSON matters

The screenshot shows a web browser displaying the GitHub REST API documentation at docs.github.com/en/rest/reference/search. The left sidebar contains a list of API endpoints, and the main content area shows a "Default response" example with a status of 200 OK and a JSON payload.

```
{  
  "total_count": 7,  
  "incomplete_results": false,  
  "items": [  
    {  
      "name": "classes.js",  
      "path": "src/attributes/classes.js",  
      "sha": "d7212f9dee2dcc18f084d7df8f417b80846ded5a",  
      "url": "https://api.github.com/repos/167174/contents/src/attribut  
      "git_url": "https://api.github.com/repos/167174/git/blobs/d7212  
      "html_url": "https://github.com/jquery/jquery/blob/825ac3773694e0cd23e  
      "repository": {  
        "id": 167174,  
        "node_id": "MDEwOlJlcG9zaXRvcnkxNjcxNzQ=",  
        "name": "jquery",  
        "full_name": "jquery/jquery",  
        "owner": {  
          "login": "jquery",  
          "id": 70142,  
          "node_id": "MDQ6VXNlcjcwMTQy",  
          "avatar_url": "https://0.gravatar.com/avatar/6906f317a4733f4379b06  
          "gravatar_id": "",  
          "url": "https://api.github.com/users/jquery",  
          "html_url": "https://github.com/jquery",  
          "followers_url": "https://api.github.com/users/iauerv/followers".  
        }  
      }  
    }  
  ]  
}
```

<https://docs.github.com/en/rest/reference/search>

```
#install.packages("jsonlite")
library(jsonlite)
jsonData <-
  fromJSON("https://raw.githubusercontent.com/Biuni/PokemonGO-Pokedex/master/p
head(jsonData)
```

	\$pokemon	id	num	name	img
1		1	001	Bulbasaur	http://www.serebii.net/pokemongo/pokemon/001.png
2		2	002	Ivysaur	http://www.serebii.net/pokemongo/pokemon/002.png
3		3	003	Venusaur	http://www.serebii.net/pokemongo/pokemon/003.png
4		4	004	Charmander	http://www.serebii.net/pokemongo/pokemon/004.png
5		5	005	Charmeleon	http://www.serebii.net/pokemongo/pokemon/005.png
6		6	006	Charizard	http://www.serebii.net/pokemongo/pokemon/006.png
7		7	007	Squirtle	http://www.serebii.net/pokemongo/pokemon/007.png
8		8	008	Wartortle	http://www.serebii.net/pokemongo/pokemon/008.png
9		9	009	Blastoise	http://www.serebii.net/pokemongo/pokemon/009.png
10		10	010	Caterpie	http://www.serebii.net/pokemongo/pokemon/010.png
11		11	011	Metapod	http://www.serebii.net/pokemongo/pokemon/011.png
12		12	012	Butterfree	http://www.serebii.net/pokemongo/pokemon/012.png
13		13	013	Weedle	http://www.serebii.net/pokemongo/pokemon/013.png
14		14	014	Kakuna	http://www.serebii.net/pokemongo/pokemon/014.png
15		15	015	Beedrill	http://www.serebii.net/pokemongo/pokemon/015.png
16		16	016	Pidgey	http://www.serebii.net/pokemongo/pokemon/016.png
17		17	017	Pidgeotto	http://www.serebii.net/pokemongo/pokemon/017.png
18		18	018	Pidgeot	http://www.serebii.net/pokemongo/pokemon/018.png
19		19	019	Rattata	http://www.serebii.net/pokemongo/pokemon/019.png
20		20	020	Raticate	http://www.serebii.net/pokemongo/pokemon/020.png
21		21	021	Spearow	http://www.serebii.net/pokemongo/pokemon/021.png
22		22	022	Fearow	http://www.serebii.net/pokemongo/pokemon/022.png
23		23	023	Ekans	http://www.serebii.net/pokemongo/pokemon/023.png

Data frame structure from JSON

```
dim(jsonData$pokemon)
```

```
[1] 151 17
```

```
class(jsonData$pokemon)
```

```
[1] "data.frame"
```

```
jsonData$pokemon %>% filter(type == "Fire") %>% select(!(img))
```

		id	num	name	type	height	weight	candy	candy_count
1		4	004	Charmander	Fire	0.61 m	8.5 kg	Charmander Candy	25
2		5	005	Charmeleon	Fire	1.09 m	19.0 kg	Charmander Candy	100 Not in
3		37	037	Vulpix	Fire	0.61 m	9.9 kg	Vulpix Candy	50
4		38	038	Ninetales	Fire	1.09 m	19.9 kg	Vulpix Candy	NA Not in
5		58	058	Growlithe	Fire	0.71 m	19.0 kg	Growlithe Candy	50
6		59	059	Arcanine	Fire	1.91 m	155.0 kg	Growlithe Candy	NA Not in
7		77	077	Ponyta	Fire	0.99 m	30.0 kg	Ponyta Candy	50
8		78	078	Rapidash	Fire	1.70 m	95.0 kg	Ponyta Candy	NA Not in
9		126	126	Magmar	Fire	1.30 m	44.5 kg	None	NA
10		136	136	Flareon	Fire	0.89 m	25.0 kg	Eevee Candy	NA Not in
				weaknesses			next_evolution	prev_evolution	
1				Water, Ground, Rock	005, 006,	Charmeleon, -	Charizard		NULL
2				Water, Ground, Rock		006, Charizard	004, Charmander		
3				Water, Ground, Rock		038, Ninetales			NULL
4				Water, Ground, Rock			NULL	037, Vulpix	
5				Water, Ground, Rock		059, Arcanine			NULL22/47

Going deeper..

```
class(jsonData$pokemon$type) # Can be lists
```

```
[1] "list"
```

```
jsonData$pokemon$type
```

```
[[1]]
```

```
[1] "Grass"  "Poison"
```

```
[[2]]
```

```
[1] "Grass"  "Poison"
```

```
[[3]]
```

```
[1] "Grass"  "Poison"
```

```
[[4]]
```

```
[1] "Fire"
```

```
[[5]]
```

```
[1] "Fire"
```

```
[[6]]
```

```
[1] "Fire"   "Flying"
```

```
[[7]]
```

```
[1] "Water"
```

```
[[8]]
```

Data frame structure from JSON

```
class(jsonData$pokemon$next_evolution[[1]]) # Or lists of data.frames!
```

```
[1] "data.frame"
```

```
jsonData$pokemon$next_evolution
```

```
[[1]]
```

```
  num      name
1 002  Ivysaur
2 003 Venusaur
```

```
[[2]]
```

```
  num      name
1 003 Venusaur
```

```
[[3]]
```

```
NULL
```

```
[[4]]
```

```
  num      name
1 005 Charmeleon
2 006 Charizard
```

```
[[5]]
```

```
  num      name
1 006 Charizard
```

```
[[6]]
```

JSON Lab

<http://sisbid.github.io/Data-Wrangling/labs/advanced-io-lab.Rmd>

Web Scraping

This is data

<http://bowtie-bio.sourceforge.net/recount/>

Please note that to use the expressionsets below, you will need to install Bioconductor and run the command library(BIOBASE).

» The Datasets

View the source

Please note that to use the expressionsets below, you will need to install Bioconductor and run the command library(BioBase)

» The Datasets

Study	PMID	Species	Number of biological replicates	Number of uniquely aligned reads	Expotype	Notes
bodymap	not published, but publicly available here	human	19	2,197,622,796	link	Illumina Human BodyMap 2.0 - - tissue comparison
cheung	20856902	human	41	834,584,950	link	HapMap - CEU
core	19056941	human	2	8,670,342	link	lung fibroblasts
gilad	20009012	human	6	41,356,738	link	liver; males and females
maqc	20167110	human	14 (technical)** 2 (biological)	71,970,164	original pooled	original pooled original pooled experiment: MAQC-2
montgomery	20220756	human	60	*886,468,054	link	link link HapMap - CEU
pickrell	20220758	human	69	*886,468,054	link	link link HapMap - YRI
sultan	18599741	human	4	6,573,643	link	link link cell type comparison
wang	18978772	human	22	223,929,919	link	link link tissue comparison
katz.mouse	21057496	mouse	4	14,368,471	link	link link control vs. CUG-BP1

What the computer sees

```
1 <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
2 <html xmlns="http://www.w3.org/1999/xhtml">
3 <head>
4 <script src="sorttable.js" type="text/javascript"></script>
5 <title>ReCount: analysis-ready RNA-seq gene count datasets</title>
6 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
7 <link rel="stylesheet" type="text/css" href="css/style.css" media="screen" />
8 <script type="text/javascript">
9
10 var _gaq = _gaq || [];
11 _gaq.push(['_setAccount', 'UA-26478269-2']);
12 _gaq.push(['_trackPageview']);
13
14 (function() {
15   var ga = document.createElement('script'); ga.type = 'text/javascript'; ga.async = true;
16   ga.src = ('https:' == document.location.protocol ? 'https://ssl' : 'http://www') + '.google-analytics.com/ga.js';
17   var s = document.getElementsByTagName('script')[0]; s.parentNode.insertBefore(ga, s);
18 })();
19
20 </script>
21
22 </head>
23
24 <body class="c20">
25 <div id="wrap">
26   <div id="top">
27     <div class="lefts">
28       <table width="100%" cellpadding="2">
29         <tr><td>
30           <a href=".index.shtml"><h1>ReCount</h1></a>
31           <h2>A multi-experiment resource of analysis-ready RNA-seq gene count datasets</h2>
32           </td><td align="right" valign="middle">
33             <h1><a href="http://www.biostat.jhsph.edu/"></a>&ampnbsp&ampnbsp</h1>
34           </td></tr>
35         </table>
36       </div>
37     </div>
38
39     <div id="subheader">
40       <p><b>There is now <a href="https://jhbiostatistics.shinyapps.io/recount/">a new version of recount</a> that provides processed and summarized express data for nearly 60,000 human RNA-seq samples from the Sequence Read Archive (SRA). The <a href="https://github.com/leekgroup/recount">associated Bioconductor package</a> provides a convenient API for querying, downloading, and analyzing the data. Each processed study consists of meta- and phenot data, the expression levels of genes and their underlying exons and splice junctions, and corresponding genomic annotation. See <a
```

Ways to see the source

Chrome:

1. right click on page
2. select "View Page Source"

Firefox:

1. right click on page
2. select "View Page Source"

Microsoft Edge:

1. right click on page
2. select "view source"

Safari

1. click on "Safari"
2. select "Preferences"
3. go to "Advanced"
4. check "Show Develop menu in menu bar"
5. right click on page
6. select "View Page Source"

<https://github.com/simonmunzert/rscraping-jsm-2016/blob/c04fd91fec711df65c838e07723125155a7f2cda/02-scraping-with-rvest.r>

Inspect element

Not Secure | bowtie-bio.sourceforge.net/recount/

Please note that to use the expressionsets below, you will need to install Bioculator and run the command library (biocore).

» The Datasets

Study	PMID	Species	Number of biological replicates	Number of uniquely aligned reads	Expression	Back	Forward	Reload	Notes
maqc	20167110	human	14 (technical)** 2 (biological)	71,970,164	original pooled	Save As...	Print...	Cast...	experiment: MAQC-2
modencodefly	21179090	fly	147 (technical)** 30 (biological)	2,278,788,557	original pooled	Translate to English	View Page Source	View Frame Source	developmental time course
modencodeworm	19181841	worm	46	1,451,119,823	link	Reload Frame	Inspect		developmental time course
hammer	20452967	rat	8	158,178,477	link	Speech		link	link experimental vs. control at 2 time points
nagalakshmi	18451266	yeast	4	7,688,602	link	link	link		priming technique comparison
bottomly	21455293	mouse	21	343,445,340	link	link	link		2 inbred mouse strains
yang	20363980	mouse	1	27,883,862	link	link	link		hybrid cell line, X always inactive
trapnell	20436464	mouse	4	111,376,152	link	link	link		time course
mortazavi	18516045	mouse	3	61,732,881	link	link	link		tissue comparison

Copy XPath

The screenshot shows a web browser window with the URL [Not Secure | bowtie-bio.sourceforge.net/recount/](http://bowtie-bio.sourceforge.net/recount/). A context menu is open over a table row with the ID `recounttab`. The table has columns for Study, PMID, Species, Number of biological replicates, Number of uniquely aligned reads, ExpressionSet, Count table, Phenotype table, and Notes. The rows contain data for bodymap, cheung, core, and gilad.

Study	PMID	Species	Number of biological replicates	Number of uniquely aligned reads	ExpressionSet	Count table	Phenotype table	Notes
bodymap	not published, but publicly available here	human	19	2,197,622,796	link	link	link	Illumina Human BodyMap 2.0 - tissue comparison
cheung	20856902	human	41	834,584,950	link	link	link	HapMap - CEU
core	19056941	human	2	8,670,342	link	link	link	lung fibroblasts
gilad	2000			41,356,738	link	link	link	liver; males and females

The context menu options include:

- Add attribute
- Edit as HTML
- Delete element
- Copy** (highlighted)
- Cut element
- Copy element
- Paste element
- Copy outerHTML
- Copy selector
- Copy JS path
- Copy styles
- Copy XPath** (highlighted)
- Copy full XPath
- Store as global variable
- Speech

The DevTools sidebar shows the element tree, and the bottom status bar indicates "Console What's New".

Use SelectorGadget

<https://rvest.tidyverse.org/articles/selectorgadget.html>

rvest package

```
recount_url <- "http://bowtie-bio.sourceforge.net/recount/"
# install.packages("rvest")
library(rvest)
htmlfile = read_html(recount_url)

nds <- html_nodes(htmlfile, xpath = '//*[@id="recounttab"]/table')
dat <- html_table(nds)
dat <- as.data.frame(dat)
head(dat)
```

	x1	x2	x3	
1	Study	PMID	Species	Number of biological samples
2	bodymap not published, but publicly available here		human	
3	cheung	20856902	human	
4	core	19056941	human	
5	gilad	20009012	human	
6	maqc	20167110	human	14 (technical) **
	x6	x7	x8	
1	ExpressionSet	Count table	Phenotype table	
2	link	link	link	Illumina Human BodyMap 2.0 -
3	link	link	link	
4	link	link	link	
5	link	link	link	
6	original pooled	original pooled	original pooled	liver

Little cleanup

```
colnames(dat) <- as.character(dat[1,])
dat <- dat[-1,]
head(dat)
```

	Study	PMID	Species	Number of bi
2	bodymap not published, but publicly available here		human	
3	cheung	20856902	human	
4	core	19056941	human	
5	gilad	20009012	human	
6	maqc	20167110	human	14 (technical)
7	montgomery	20220756	human	
	ExpressionSet	Count table	Phenotype table	
2	link	link	link	Illumina Human BodyMap 2.0 -
3	link	link	link	
4	link	link	link	
5	link	link	link	
6	original pooled	original pooled	original pooled	
7	link	link	link	liver

Ethics and Web Scraping

<https://slate.com/culture/2020/04/whitney-museum-new-york-apartment-exhibit-creators-interview.html>

BROW BEAT

An Art Exhibit You Can Visit Without Leaving Your Couch

The creators of the Whitney Museum's *New York Apartment* explain how they combined thousands of listings into a website for one massive, \$43.9 billion dwelling.

BY RACHELLE HAMPTON

APRIL 02, 2020 • 7:30 AM

NEW YORK APARTMENT

FOR SALE
\$43,869,676,331

65,764 bedrooms
55,588 bathrooms
36,672,535 sq ft

Are you constantly frustrated with seeing the same low grade renovations and design choices in homes? Are you in love with your-wait? Are you looking for a charming well-groomed bedroom home in a sought-after area? Are you looking for a cozy, elegant home close to all the action in the city? Are you looking for a doll? Are you looking for a great investment home? Are you looking for a loft-like open space with both light and privacy? Are you looking for Beautiful Open Views? Are you looking for the House that is in your Price Range, is DETACHED, has 3 Bedrooms, 4 Bathrooms, is located in the highly desired Princess Bay Section of Staten Island with Water Views & NOT IN A FLOOD ZONE surrounded by Million Dollar Homes? Are you looking for the perfect balance of urban and suburban living? Are you looking for the perfect primary residence, pied a terre or investment property? Are you looking to do a Lease or Rent to Own Home?



Ethics and Web Scraping

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Contents lists available at ScienceDirect

Data in Brief

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Data Article

COVID-19: A scholarly production dataset report for research analysis



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ABSTRACT

COVID-2019 has been recognized as a global threat, and several studies are being conducted in order to contribute to the fight and prevention of this pandemic. This work presents a scholarly production dataset focused on COVID-19, providing an overview of scientific research activities, making it possible to identify countries, scientists and research groups most active in this task force to combat the coronavirus disease. The dataset is composed of 40,212 records of articles' metadata collected from Scopus, PubMed, arXiv and bioRxiv databases from January 2019 to July 2020. Those data were extracted by using the techniques of Python Web Scraping and preprocessed with Pandas Data Wrangling. In addition,

Ethics and Web Scraping

<https://techcrunch.com/2017/04/28/someone-scraped-40000-tinder-selfies-to-make-a-facial-dataset-for-ai-experiments/>



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Someone scraped 40,000 Tinder selfies to make a facial dataset for AI experiments



Natasha Lomas @riptari 7:21 PM EDT • April 28, 2017

Comment

Tinder users have many motives for uploading their likeness to the dating app. But contributing a facial biometric to a downloadable data set for training convolutional neural networks probably wasn't top of their list when they signed up to swipe.

A user of Kaggle, a platform for machine learning and data science competitions which was recently acquired by Google, has uploaded a facial data set he says was created by exploiting Tinder's API to scrape 40,000 profile photos from Bay Area users of the dating app — 20,000 apiece from profiles of each gender.

The data set, called [People of Tinder](#), consists of six downloadable zip files, with four containing around 10,000 profile photos each and two files with sample sets of around 500 images per gender.

Some users have had multiple photos scraped from their profiles, so there is likely a lot fewer

Ethics and Web Scraping

<https://on.wsj.com/3hzeu9i>

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Alibaba Falls Victim to Chinese Web Crawler in Large Data Leak

Software developer scrapes 1.1 billion pieces of user data, including IDs and phone numbers, over eight months



Ant, Alibaba Show How China's Big Tech Faster Than Other Countries

In less than six months, China's tech giant Ant went from planning a blockbuster IPO to restructuring in response to pressure from the central bank. As the U.S. also takes aim at big tech, here's how China is moving faster. Photo illustration: Sharon Shi

MOST POPULAR NEWS

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APIs

Application Programming Interfaces

<https://developers.facebook.com/>

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DEVELOPER TOOLS

Take a closer look at the products we offer.

Messenger

Build lasting customer relationships through conversation.



Learn more

Instagram

Create tools for businesses, creators, and people to enhance the Instagram experience.



Learn more

Business Tools

Build and scale your business across the Facebook family of apps.



Learn more

Open Source

Artificial Intelligence

AR/VR

In biology too!

<http://www.ncbi.nlm.nih.gov/books/NBK25501/>

<https://www.ncbi.nlm.nih.gov/home/develop/api/>

The screenshot shows a web browser displaying the "Entrez Programming Utilities Help" page. The URL in the address bar is [ncbi.nlm.nih.gov/books/NBK25501/](http://www.ncbi.nlm.nih.gov/books/NBK25501/). The page content includes a sidebar with the title "Entrez Programming Utilities Help", the "NCBI Help Manual" logo, and the "National Center for Biotechnology Information" logo. The main content area features a heading "Entrez Programming Utilities Help", a note about the source being Bethesda (MD): National Center for Biotechnology Information (US); 2010-, and a search bar labeled "Search this book". To the right, there are social sharing icons for Facebook, Twitter, and Google+. A sidebar on the right contains sections for "Views" (PubReader, Print View, Cite this Page, PDF version of this title (1.8M)), "Other titles in this collection" (NCBI Help Manual), "Related information" (NLM Catalog), and "Recent Activity" (a list of recent documents including "Entrez Programming Utilities Help", "A fully automated pipeline for brain structure segmentation in multiple sclerosis...", "Validation of Accelerometer Wear and Nonwear Time Classification Algorithm", "The Evolution of Earned, Transparent, and Quantifiable Faculty Salary Compensation", and "Evaluating the Impact of Intensity Normalization on MR Image"). At the bottom, there are links for "Expand All" and "Collapse All", and a footer note stating "Created: December 12, 2008; Last Update: October 24, 2018."

Step 0: Did someone do this already

<https://ropensci.org/packages/>

The screenshot shows the rOpenSci Packages page. At the top, there is a navigation bar with links for About, Blog, Projects, Packages, Community, and Resources. Below the navigation bar, the title "rOpenSci Packages" is displayed, followed by the subtitle "All of our packages in one place". A search bar contains the query "api", and a blue "Search" button is to its right. Below the search bar, there are three filter buttons: "Active" (which is selected), "Experimental", and "Archived". To the right of these filters, it says "Showing 10 of 101". The main content area displays three package cards:

- patentsview** (CRAN, Peer-reviewed) - Maintainer: Christopher Baker. An R Client to the PatentsView API.
- rcrossref** (CRAN, Staff maintained) - Maintainer: Scott Chamberlain. Client for Various CrossRef APIs.
- rcites** (CRAN, Peer-reviewed) - Maintainer: Kevin Cazelles. R Interface to the Species+ Database.

Each package card includes a small icon, the package name, its CRAN status, maintainer information, and a plus sign icon for adding the package.

Step 0: Did someone do this already

tidycensus package: <https://walker-data.com/tidycensus/articles/basic-usage.html>

tidycensus **1.0.0.9000**  Reference Articles ▾ Changelog 

tidycensus

tidycensus is an R package that allows users to interface with the US Census Bureau's decennial Census and five-year American Community APIs and return tidyverse-ready data frames, optionally with simple feature geometry included. Install from CRAN with the following command:

```
install.packages("tidycensus")
```

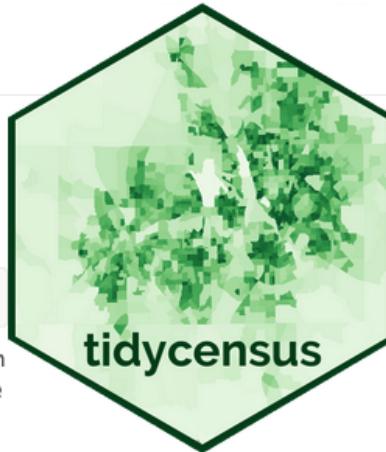
tidycensus is designed to help R users get Census data that is pre-prepared for exploration within the **tidyverse**, and optionally spatially with **sf**. To learn more about how the package works, please read through the following articles:

- [Basic usage of tidycensus](#)
- [Spatial data in tidycensus](#)
- [Margins of error in the ACS](#)
- [Other Census Bureau datasets](#)
- [Working with Census microdata](#)

Future development

To keep up with on-going development of **tidycensus** and get even more examples of how to use the package, subscribe to the Walker Data email list below. You'll also get updates on the forthcoming CRC Press book *Analyzing the US Census with R*, which will cover a wide range of Census data analysis applications.

While tidycensus focuses on a select number of US Census Bureau datasets, there are many others available via the Census Bureau API. For access to all of these APIs, please check out Hannah Recht's excellent [censusapi package](#).



Links

Download from CRAN at <https://cloud.r-project.org/package=tidycensus>

Browse source code at <https://github.com/walkerke/tidycensus/>

Report a bug at <https://github.com/walkerke/tidycensus/issues>

License

MIT + file [LICENSE](#)

Developers

Kyle Walker
Author, maintainer

Matt Herman
Author

[All authors...](#)

Dev status

 [R-CMD-check](#) 

Step 1: DIY

<https://github.com/ThatCopy/catAPI/wiki/Usage>

```
#install.packages("httr")
library(httr)

# Requests a random cat fact
query_url <- "https://thatcopy.pw/catapi/rest/"

req <- GET(query_url)
content(req)
```

```
{html_document}
<html>
  <head>
    <meta http-equiv="refresh" content="0" />
    <title>thatcopy.pw | 523</title>
  </head>
  <body>
    <div id="cf-wrapper">
      <div id="cf-error-details" class="cf-wrapper cf-something-went-wrong">
        <h1>Whoops! That page can't be found.</h1>
        <p>The link you followed may be broken or the page may have moved. Try searching for the page by name in the search bar below, or go back to the previous page if you're ready to leave thatcopy.pw.</p>
        <div>
          <input type="text" placeholder="Search thatcopy.pw" />
          <button>Search</button>
        </div>
      </div>
    </div>
  </body>
</html>
```

Not all APIs are “open”

<https://www.rdocumentation.org/packages/twitteR/versions/1.1.9>

```
# install.packages("twitteR")
library(twitteR)
# Supplied by Twitter
setup_twitter_oauth("API key", "API secret")

searchTwitter("crab cake", geocode="39.290692,-76.610221,5mi")
```

<https://developer.twitter.com/en/portal/petition/academic/is-it-right-for-you>

Not all APIs are “open”

<https://walker-data.com/tidycensus/articles/basic-usage.html>

```
# install.packages("tidycensus")
library(tidycensus)
# Supplied by census.gov
census_api_key("YOUR API KEY GOES HERE")

get_decennial(geography = "state",
              variables = "P013001", # code for median age
              year = 2010)
```