Week 7
Looking for sentiment words, regular expressions
Chapter 8

Dr. Dave Campbell

Using csv files

Week 2 lab:

2 Loading a csv file and dealing with data types

Download the file "pokemon_2018.csv" data file from `https://www.kaggle.com/alopez247/pokemon` or from canvas.

You may need to use the setwd and getwd commands at this time.

```
poke = read.csv(file = "pokemon_2019.csv",
    header = TRUE, sep = ",")
head(poke)
```

```
##   Number       Name Type_1 Type_2 Total HP Attack
## 1      1  Bulbasaur  Grass Poison   318 45     49
## 2      2    Ivysaur  Grass Poison   405 60     62
## 3      3   Venusaur  Grass Poison   525 80     82
## 4      4 Charmander   Fire          309 39     52
## 5      5 Charmeleon   Fire          405 58     64
## 6      6  Charizard   Fire Flying   534 78     84
```

Midterm (value 16%)

If you do better on the final we will shrink this to 10%.

Go to lab, practice on lab machines, do extra problems, be organized, have common code snippets ready

Finding or replacing text

grep(pattern, x,…) #returns a vector of the indices of the elements

gregexpr(pattern, text,…) #gregexpr returns a list of the same length as text each element of which is of the same form as the return value for regexpr, except that the starting positions of every (disjoint) match are given.

gsub(pattern, replacement, x,…) #gsub replaces all occurrences

grep:
input a vector or list
output indices of elements with the pattern

```
(ExampleText = c("1 - small thing to do","2 - 2 big things that we're doing","Some Small things that were done 4 free - 333", "four Things that we've done"))

grep("that", ExampleText) #which elements have that

grep("small", ExampleText) #which elements have small (but not Small)

grep("small", ExampleText, ignore.case = TRUE) #which elements have small or Small or smAll,…

grep("small", ExampleText, ignore.case = TRUE,value=TRUE) #which elements contains small, or Small, or smALl,..
```

grepl:
input a vector or list
output TRUE/FALSE for pattern presence in element

```
(ExampleText = c("1 - small thing to do","2 - 2 big things that we're doing","Some Small things that were done 4 free - 333", "four Things that we've done"))

grepl("that", ExampleText) #which elements have that

grepl("small", ExampleText) #which elements have small (but not Small)

grepl("small", ExampleText, ignore.case = TRUE) #which elements have small or Small or smAll,…
```

substr: subset a string of text
input is a string of text
output is the elements from **start** to **stop.**

(Example1 = "1 - small thing to do")

grep just says if “mall” exists (1) or not (0) in Example1

grep("mall",Example1) #element in which it exists (there is only one element)

grep("mdall",Example1) #can’t be found

#Extract the letters between positions **start** and **stop** (inclusive)

substr(Example1,**start**=6,**stop**=15)

gregexpr:
input a vector or list of text
output list showing text start position and pattern length

```
(ExampleText = c("1 - small thing to do","2 - 2 big things that we're doing","Some Small things that were done 4 free - 333", "four Things that we've done"))



gregexpr("thing", ExampleText)

gregexpr("small", ExampleText)

gregexpr("small", ExampleText, ignore.case = TRUE)
```

gsub:
replace a pattern within a string
input a list, vector, or string

```
(ExampleText = c("1 - small thing to do","2 - 2 big things that we're doing","Some Small things that were done 4 free - 333", "four Things that we've done"))
```

```
gsub("thing", "stuff", ExampleText) #replace “thing” with “stuff”

gsub("thing", "stuff", ExampleText,ignore.case = TRUE) # replace “thing”,”Thing”, “ThInG”,… with “stuff”
```

Finding General Pieces:

R uses "\" to say "let's do something fancy", follow it with:

\w = word characters (groups of letters)

\W = no word characters

\s = space characters

\S = no space characters

\d = digits

\D = no digits

\b = word edge

\B = no word edge

\< = word beginning

\> = word end

Finding General Pieces:

To use these you may need to use the argument: perl=TRUE

\\w = word characters (groups of letters)

\\W = no word characters

\\s = space characters

\\S = no space characters

\\d = digits

\\D = no digits

\\b = word edge

\\B = no word edge

\\< = non-word end

\\> = word end

Finding General Pieces:

To use these you may need to use the argument: perl=TRUE

```
gsub("\\w", "*", ExampleText)
#word characters

gsub("\\W", "*", ExampleText)  #No
word characters

gsub("\\s", "*", ExampleText)
#space characters

gsub("\\S", "*", ExampleText)
#non space characters

gsub("\\d", "*", ExampleText)  #
digits
```

```
gsub("\\D", "*", ExampleText)
#Non  digits

gsub("\\b", "*", ExampleText,perl
=TRUE)  # word bound

gsub("\\B", "*", ExampleText,perl
=TRUE)  #not word bounds

gsub("\\>", "*", ExampleText) #
word end

gsub("\\<", "*", ExampleText) #
NON-word end
```

Another way of finding General Pieces:

```
gsub("[[:digit:]]", "*", ExampleText)    #numbers 0-9

gsub("[[:lower:]]", "*", ExampleText)  #lower case a-z

gsub("[[:upper:]]", "*", ExampleText)  #UPPER CASE A-Z

gsub("[[:alpha:]]", "*", ExampleText) #letters

gsub("[[:alnum:]]", "*", ExampleText)  #numbers and letters

gsub("[[:punct:]]", "*", ExampleText)  # punctuation marks

gsub("[[:graph:]]", "*", ExampleText)  # numbers, letters, and punctuation

gsub("[[:space:]]", "*", ExampleText) #just spaces

gsub("[[:blank:]]", "*", ExampleText)  # spaces and tabs

gsub("[[:print:]]", "*", ExampleText) # all printable characters
```

https://www.rstudio.com/resources/cheatsheets/

regular expressions:

https://www.rstudio.com/wp-content/uploads/2016/09/RegExCheatsheet.pdf

Composites & finding very specific pieces

gsub("(s|S)mall", "Bigly", ExampleText) # replace **small or Small**

gsub("we[[:punct:]]", "*", ExampleText) #replace **we've and we're but not were**

gsub("\\B", "*", ExampleText,perl =TRUE)   # replace **non-word end punctuation word end**

gsub("\\b[[:alpha:]]{4}\\b", "*", ExampleText,perl =TRUE) # replace four letter words

gsub("[[:digit:]]*[[:alpha:]]+[[:punct:]]", "*", ExampleText,perl =TRUE) #

gsub("\\b[[:alpha:]]{4,5}\\b", "*", ExampleText,perl =TRUE) # replace four or five letter words

Table “National Parks and National Park Reserves” from https://en.wikipedia.org/wiki/List_of_National_Parks_of_Canada

NationalParks = c(" Aulavik Northwest Territories 12,200 km2 (4,710 sq mi) 1992
Auyuittuq Pangnirtung Fiord S 2 2001-07-15.jpg Nunavut 19,089 km2 (7,370 sq mi) 2001
Banff Moraine Lake 17092005.jpg Alberta 6,641 km2 (2,564 sq mi) 1885
Bruce Peninsula CyprusLake - Bruce Peninsula.jpg Ontario 154 km2 (59 sq mi) 1987
Cape Breton Highlands NS CapeBretonHighlands1 tango7174.jpg Nova Scotia 949 km2 (366 sq mi) 1936
Elk Island Bison Elk Island.jpg Alberta 194 km2 (75 sq mi) 1913
Forillon Forillon National Park of Canada 1.jpg Quebec 244 km2 (94 sq mi) 1970
Fundy Fundy NP New Brunswick 1.jpg New Brunswick 206 km2 (80 sq mi) 1948
Georgian Bay Islands BeausoleilIslandCedarSprings2004.jpg Ontario 14 km2 (5 sq mi) 1929
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Mount Revelstoke Revelstoke from Mount Revelstoke.jpg British Columbia 260 km2 (100 sq mi) 1914
Naats'ihch'oh[4] (Reserve) Howard's Pass Yukon Territory 1.jpg Northwest Territories 4,850 km2 (1,873 sq mi) 2014
Nahanni (Reserve) Nahanni - VirginiaFalls.jpg Northwest Territories 30,000 km2 (11,583 sq mi) 1976
Pacific Rim (Reserve) Longbeach prnp.jpg British Columbia511 km2 (197 sq mi) 1970
Point Pelee Point Pelee looking south.jpg Ontario 15 km2 (6 sq mi) 1918
Prince Albert Prince Albert National Park.jpg Saskatchewan 3,874 km2 (1,496 sq mi) 1927
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Wood Buffalo Wood-Buffalo-NP Gros Beak Lake 2 98-07-02.jpg Alberta Northwest Territories 44,807 km2 (17,300 sq mi) 1922
Yoho YohoNP-Takakkaw IMG 1372-800x533byBMK.jpg British Columbia 1,313 km2 (507 sq mi) 1886")

How to split into Rows and Columns?

FewRows = c(" Aulavik Northwest Territories 12,200 km2 (4,710 sq mi) 1992

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RowSplits = strsplit(FewRows,"\n")

One Row

Row1 = c(" Aulavik   Northwest Territories
12,200 km2 (4,710 sq mi)   1992")

One Row

Row1 = c(" Aulavik   Northwest Territories
12,200 km2 (4,710 sq mi)   1992")

OneRow = strsplit(Row1,"\t")

Make a data frame by splitting into rows and columns

See Stat 341 for other R options (i.e. using apply, lapply, parLapply,…)

(RowSplits = strsplit(FewRows,"\n|\t")) #Split at line breaks “\n” OR tabs “\t”:

splitup = unlist(strsplit(FewRows,"\n|\t")) #Make a data.frame:

Make a data frame by splitting into rows and columns

```
(RowSplits = strsplit(FewRows,"\n|\t")) #Split at line breaks “\n” OR tabs “\t”:

splitup = unlist(strsplit(FewRows,"\n|\t")) #Make a data.frame


N = length(splitup)

Name        = splitup[seq(1,N,by=5)]

Photo       = splitup[seq(2,N,by=5)]

Location    = splitup[seq(3,N,by=5)]

Area        = splitup[seq(4,N,by=5)]

Established = splitup[seq(5,N,by=5)]

(Parks = cbind(Name,Location,Area,Established))
```

Dealing with Area

Area:

Area = "12,200 km2 (4,710 sq mi)"

Split into 2 columns: km2 & sq mi

Finding special characters requires escaping from the regular way of using them.

gsub("(", "*", Area) # error

“\\(” escapes and then looks for the (

gsub("\\(", "*", Area)

“.” means any character except a line break

“*” means **≥0** matches

gsub("\\(.*\\)", "*", Area)

How do we get rid of bracket stuff AND punctuation?

How do we get vectors of sqmi and km2?

Making a data frame from web table copied data

```
(km2 = gsub("[[:punct:]]|km2.*\\)", "", Area) )

(km2 = as.numeric(gsub("[[:punct:]]|km2.*\\)", "",
Area) ))

(sqmi = as.numeric(gsub(".*\\(|[[:alpha:]]|[[:punct:]]", "",
Area) ))
```

```
(Parks =
cbind(Name,Location,km2,sqmi,Establis
hed))
```

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(Parks = cbind(Name,Location,Area,Established))
```

https://twitter.com/CIPSToronto/status/831610306111614977

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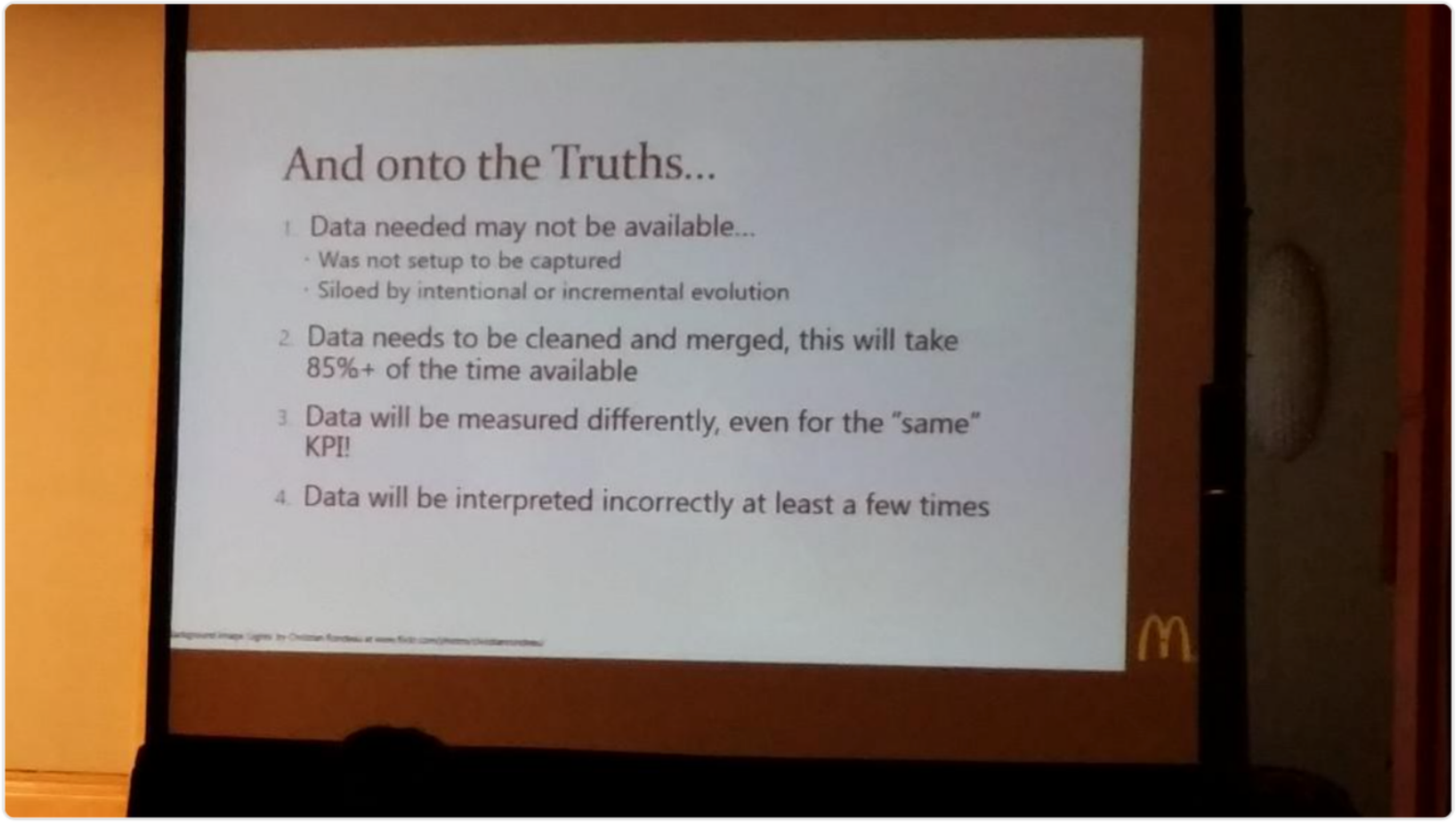
@CIPSToronto

Follow

Diep of @McD_Canada tells #BigDataCA that 85% of time spent on data cleansing merging



RETWEET
1

1:05 PM - 14 Feb 2017 from Toronto, Ontario