Basic Text-An funcs in Tidytext

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Hi all,

First things first. Here is the setup code chunk. If any of the libraries are missing in your system, well, you know how to install them.

```
if (!require(tm)) {install.packages("tm")}
```

```
## Loading required package: tm

## Loading required package: NLP
```

```
if (!require(wordcloud)) {install.packages("wordcloud")}
```

```
## Loading required package: wordcloud

## Loading required package: RColorBrewer
```

```
if (!require(igraph)) {install.packages("igraph")}
```

```
## Loading required package: igraph

##
## Attaching package: 'igraph'

## The following objects are masked from 'package:stats':
##
##     decompose, spectrum

## The following object is masked from 'package:base':
##
##     union
```

```
if (!require(ggraph)) {install.packages("ggraph")}
```

```
## Loading required package: ggraph

## Loading required package: ggplot2

##
## Attaching package: 'ggplot2'

## The following object is masked from 'package:NLP':
##
##     annotate
```

```
if (!require(tidytext)) {install.packages("tidytext")}
```

```
## Loading required package: tidytext
```

```
if (!require(widyr)) {install.packages("widyr")}
```

```
## Loading required package: widyr
```

```
library(tm)
library(tidyverse)
```

```
## -- Attaching packages -------------------------------------------------------------------------------
## v tibble  2.1.1     v purrr   0.3.2
## v tidyr   0.8.3     v dplyr   0.8.1
## v readr   1.3.1     v stringr 1.4.0
## v tibble  2.1.1     v forcats 0.4.0
```

```
## -- Conflicts ----------------------------------------------------------------------
## x ggplot2::annotate()    masks NLP::annotate()
## x dplyr::as_data_frame() masks tibble::as_data_frame(), igraph::as_data_frame()
## x purrr::compose()       masks igraph::compose()
## x tidyr::crossing()      masks igraph::crossing()
## x dplyr::filter()        masks stats::filter()
## x dplyr::groups()        masks igraph::groups()
## x dplyr::lag()           masks stats::lag()
## x purrr::simplify()      masks igraph::simplify()
```

```
library(tidytext)
library(wordcloud)
library(igraph)
library(ggraph)
```

## == Read in a real dataset (IBM) for basic text-an ==

Below is a transcript of IBM Q3's 2016 analyst call. What kind of context would you expect to see in an analyst call report?

Can we quickly text-an the same and figure out what the content is saying?

```
## reading in IBM analyst call data from my git
ibm = readLines('swiggy.txt')  #IBM Q3 2016 analyst call transcript
# ibm = readLines(file.choose())  # read from local file on disk
head(ibm, 5)    # view a few lines
```

```
## [1] "craved ice creame scorching afternoon ordered scoops delivery boy"
## [2] "hi team way possible include group conversation among friends list feedback best dishes offered
## [3] "start service morning breakfast aligarh uttar pradesh many famous shops kachauri samaosa etc"
## [4] "hunger takes time essence top restaurants go zero full flash"
## [5] "telling would compensations na ill stop using make atleast people stop using called app paid to
```

We saw how to build DTMs. Let us functionize that code in general terms so that we can repeatedly invoke the func where required.

```
dtm_build <- function(raw_corpus, tfidf=FALSE)
{                   # func opens

require(tidytext); require(tibble); require(tidyverse)

# converting raw corpus to tibble to tidy DF
textdf = data_frame(text = raw_corpus);    textdf

tidy_df = textdf %>%
                   mutate(doc = row_number()) %>%
                   unnest_tokens(word, text) %>%
                   anti_join(stop_words) %>%
                   group_by(doc) %>%
                   count(word, sort=TRUE)
tidy_df

# evaluating IDF wala DTM
if (tfidf == "TRUE") {
   textdf1 = tidy_df %>%
 group_by(doc) %>%
 count(word, sort=TRUE) %>% ungroup() %>%
 bind_tf_idf(doc, word, n) %>% # 'nn' is default colm name
 rename(value = tf_idf)} else { textdf1 = tidy_df %>% rename(value = n)  }

textdf1

dtm = textdf1 %>% cast_sparse(doc, word, value);    dtm[1:9, 1:9]

# order rows and colms putting max mass on the top-left corner of the DTM
colsum = apply(dtm, 2, sum)
col.order = order(colsum, decreasing=TRUE)
row.order = order(rownames(dtm) %>% as.numeric())

dtm1 = dtm[row.order, col.order];    dtm1[1:8,1:8]

return(dtm1)  }   # func ends

# testing func 2 on ibm data
system.time({ dtm_ibm_tf = dtm_build(ibm) })    # 0.02 secs
```

```
## Warning: `data_frame()` is deprecated, use `tibble()`.
## This warning is displayed once per session.
```

```
## Joining, by = "word"
```

```
##    user  system elapsed
##   0.656   0.127   0.784
```

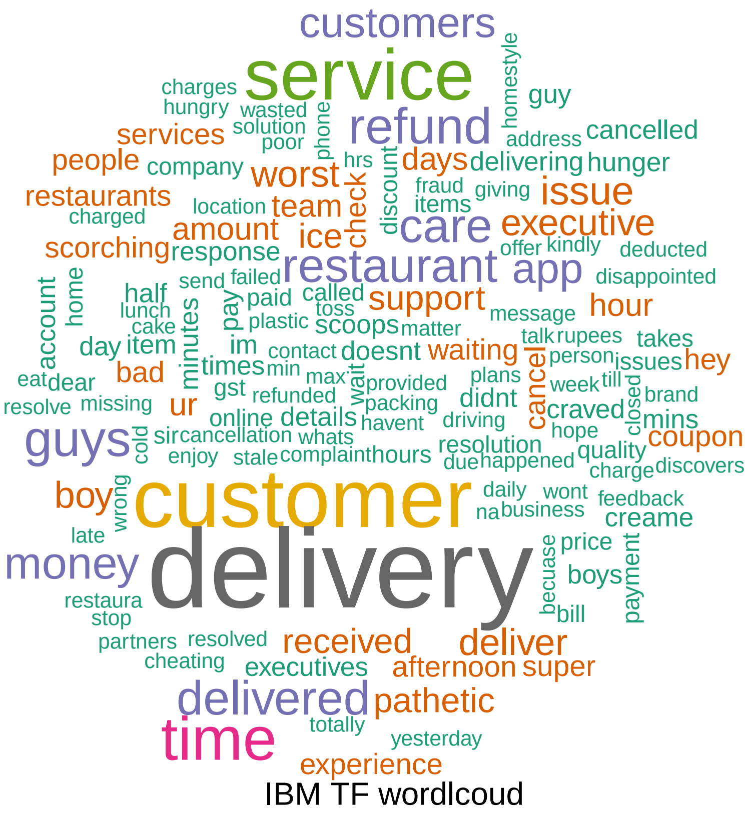
```
system.time({ dtm_ibm_idf = dtm_build(ibm, tfidf=TRUE) })  # 0.05 secs
```

```
## Joining, by = "word"
```

```
##    user  system elapsed
##   0.543   0.094   0.637
```

Func 3: wordcloud building

```
build_wordcloud <- function(dtm,
                               max.words1=150,     # max no. of words to accommodate
                               min.freq=5,       # min.freq of words to consider
                               plot.title="wordcloud"){          # write within double quotes

require(wordcloud)
if (ncol(dtm) > 20000){   # if dtm is overly large, break into chunks and solve

tst = round(ncol(dtm)/100)  # divide DTM's cols into 100 manageble parts
a = rep(tst,99)
b = cumsum(a);rm(a)
b = c(0,b,ncol(dtm))

ss.col = c(NULL)
for (i in 1:(length(b)-1)) {
 tempdtm = dtm[,(b[i]+1):(b[i+1])]
 s = colSums(as.matrix(tempdtm))
 ss.col = c(ss.col,s)
 print(i)      } # i loop ends

tsum = ss.col

} else { tsum = apply(dtm, 2, sum) }

tsum = tsum[order(tsum, decreasing = T)]       # terms in decreasing order of freq
head(tsum);    tail(tsum)

# windows()  # Opens a new plot window when active
wordcloud(names(tsum), tsum,     # words, their freqs
         scale = c(3.5, 0.5),     # range of word sizes
         min.freq,                     # min.freq of words to consider
         max.words = max.words1,       # max #words
         colors = brewer.pal(8, "Dark2"))    # Plot results in a word cloud
title(sub = plot.title)     # title for the wordcloud display

   } # func ends

# test-driving func 3 via IBM data
system.time({ build_wordcloud(dtm_ibm_tf, plot.title="IBM TF wordlcoud") })    # 0.4 secs
```



```
##    user  system elapsed
##   0.691   0.091   0.786
```

And now, test driving the IDF one…

```
system.time({ build_wordcloud(dtm_ibm_idf, plot.title="IBM IDF wordlcoud", min.freq=2) })    # 0.09 se
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : svavgzt could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : automation could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : vizag could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : sorryi could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : provoking could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : xhhcvtvee could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : abschattet could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : kharekhar could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : shodddy could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hdhdhd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : fghhs could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : gfhdh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhdjdh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : piggy could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : mam could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : awww could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hrjjr could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhsheh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ahahahahahahahahahaha could not be fit on page.
## It will not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : swiggi could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : chill could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : lintas could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : rajmachawal could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : trippin could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ghdhhd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hushe could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : venkatesh could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : zbhctve could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : skdjctrv could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : thankyou could not be fit on page. It will not be
## plotted.
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : raspans could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ghdye could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : quitzomato could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : greedy could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : palais could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : sjhwyywtts could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhshdh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhdhrh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : references could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : svvssghs could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhdhdh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : dggff could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : staple could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : reminder could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : sankarannas could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hjsje could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : repl could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : texted could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : anzuraten could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : wooooo could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : sooo could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ah could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhdje could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : bchxhhd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ignoring could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ghdhdh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : watching could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hdjdj could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : schafsfell could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : dhfgf could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : condone could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : rescue could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : planned could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : koisa could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : dday could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : newapplaunch could not be fit on page. It will
## not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : brownie could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : sricharan could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : morons could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : abduct could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : inputs could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : tyshd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : cheaper could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : crooks could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ghrjjd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : whatsover could not be fit on page. It will not
## be plotted.
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ghxjdh could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : curry could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : royal could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : alaoeur could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : rocks could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hellos could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : ground could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : whorst could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hdjjd could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhshd could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : lowe could not be fit on page. It will not be
## plotted.
```

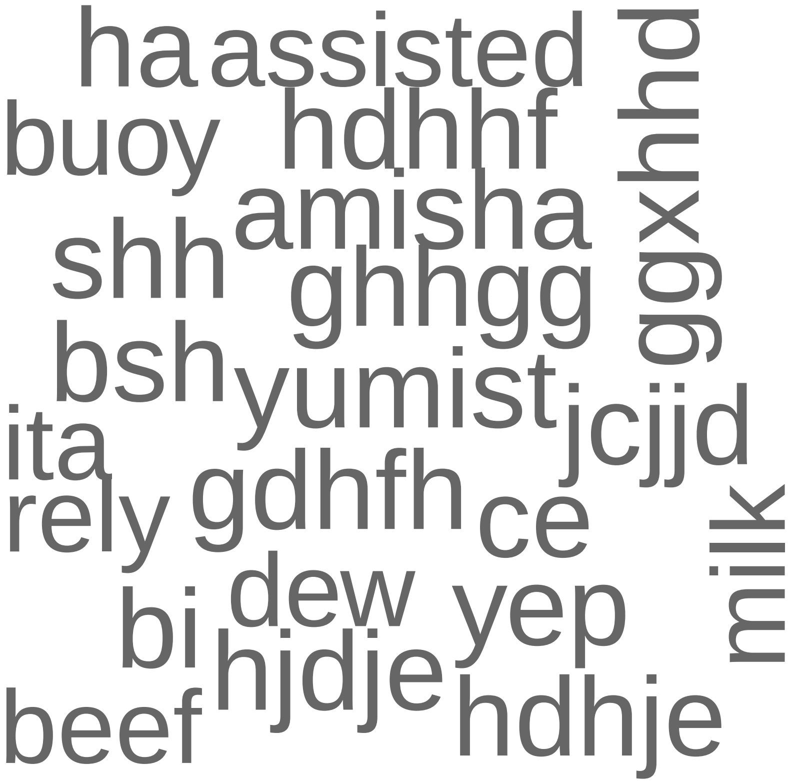
```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : jejje could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : clearing could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : suman could not be fit on page. It will not be
## plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : angewandt could not be fit on page. It will not
## be plotted.
```

```
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : swigg could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : actionit could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : chffd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhxjxh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : dissatisfied could not be fit on page. It will
## not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : raipur could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : promotion could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhhsh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : savage could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhdjd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : satuafactory could not be fit on page. It will
## not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : godbig could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : aaa could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : art could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : foot could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : swiggyappraisals could not be fit on page. It
## will not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : corruptswiggy could not be fit on page. It will
## not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : gydhey could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : huy could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : bhhdhd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : gaststtte could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : safedrivelonglife could not be fit on page. It
## will not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : robbery could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : inspiration could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : okkk could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : pull could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : remaining could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : slower could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hdj could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : swiggyfood could not be fit on page. It will not
## be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hdghdh could not be fit on page. It will not be
## plotted.
## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhdheh could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhdhhd could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : nonsenseswiggy could not be fit on page. It will
## not be plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : brother could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : broman could not be fit on page. It will not be
## plotted.

## Warning in wordcloud(names(tsum), tsum, scale = c(3.5, 0.5), min.freq,
## max.words = max.words1, : hhfhf could not be fit on page. It will not be
## plotted.
```



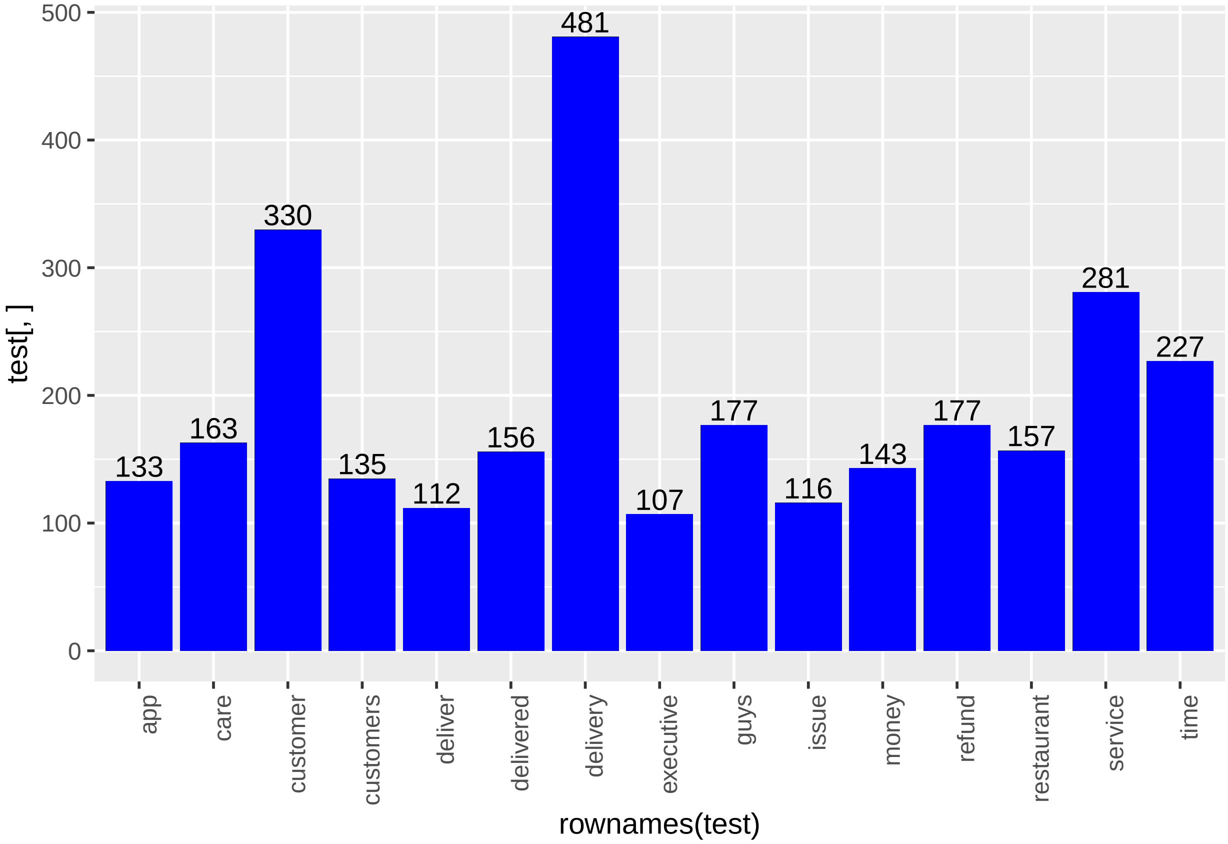
IBM IDF wordlcoud

```
##    user  system elapsed
##   0.966   0.068   1.127
```

Func 4: Simple Bar.charts of top tokens

Self-explanatory. And simple. But just for completeness sake, making a func out of it.

```
plot.barchart <- function(dtm, num_tokens=15, fill_color="Blue")
{
a0 = apply(dtm, 2, sum)
a1 = order(a0, decreasing = TRUE)
tsum = a0[a1]

# plot barchart for top tokens
test = as.data.frame(round(tsum[1:num_tokens],0))


# windows()  # New plot window
require(ggplot2)
p = ggplot(test, aes(x = rownames(test), y = test[,])) +
      geom_bar(stat = "identity", fill = fill_color) +
      geom_text(aes(label = test[,]), vjust= -0.20) +
      theme(axis.text.x = element_text(angle = 90, hjust = 1))

plot(p) }  # func ends

# testing above func
system.time({ plot.barchart(dtm_ibm_tf) })    # 0.1 secs
```



```
##    user  system elapsed
##   0.474   0.029   0.506
```

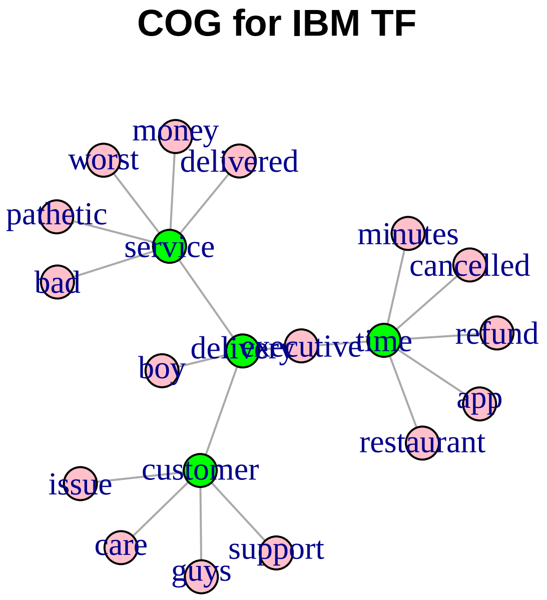
```
# system.time({ plot.barchart(dtm_ibm_idf, num_tokens=12, fill_color="Red") })    # 0.11 secs
```

Func 5: Co-occurrence graphs (COGs)

COGs as the name suggests connects those tokens together that most co-occur within documents, using a network graph wherein the nodes are tokens of interest.

This is admittedly a slightly long-winded func. Also introduces network visualization concepts. If you're unfamiliar with this, pls execute the func's content line-by-line to see what each line does.

```
distill.cog = function(dtm, # input dtm
                       title="COG", # title for the graph
                       central.nodes=4,    # no. of central nodes
                       max.connexns = 5){  # max no. of connections

# first convert dtm to an adjacency matrix
dtm1 = as.matrix(dtm)   # need it as a regular matrix for matrix ops like %*% to apply
adj.mat = t(dtm1) %*% dtm1    # making a square symmatric term-term matrix
diag(adj.mat) = 0     # no self-references. So diag is 0.
a0 = order(apply(adj.mat, 2, sum), decreasing = T)   # order cols by descending colSum
mat1 = as.matrix(adj.mat[a0[1:50], a0[1:50]])

 # now invoke network plotting lib igraph
 library(igraph)

 a = colSums(mat1) # collect colsums into a vector obj a
 b = order(-a)     # nice syntax for ordering vector in decr order

 mat2 = mat1[b, b]      # order both rows and columns along vector b
 diag(mat2) =  0

 ## +++ go row by row and find top k adjacencies +++ ##

 wc = NULL

 for (i1 in 1:central.nodes){
   thresh1 = mat2[i1,][order(-mat2[i1, ])[max.connexns]]
   mat2[i1, mat2[i1,] < thresh1] = 0   # neat. didn't need 2 use () in the subset here.
   mat2[i1, mat2[i1,] > 0 ] = 1
   word = names(mat2[i1, mat2[i1,] > 0])
   mat2[(i1+1):nrow(mat2), match(word,colnames(mat2))] = 0
   wc = c(wc, word)
 } # i1 loop ends


 mat3 = mat2[match(wc, colnames(mat2)), match(wc, colnames(mat2))]
 ord = colnames(mat2)[which(!is.na(match(colnames(mat2), colnames(mat3))))]  # removed any NAs from th
 mat4 = mat3[match(ord, colnames(mat3)), match(ord, colnames(mat3))]

 # building and plotting a network object
 graph <- graph.adjacency(mat4, mode = "undirected", weighted=T)    # Create Network object
 graph = simplify(graph)
 V(graph)$color[1:central.nodes] = "green"
 V(graph)$color[(central.nodes+1):length(V(graph))] = "pink"

 graph = delete.vertices(graph, V(graph)[ degree(graph) == 0 ]) # delete singletons?

 plot(graph,
      layout = layout.kamada.kawai,
      main = title)

 } # distill.cog func ends

# testing COG on ibm data
system.time({ distill.cog(dtm_ibm_tf, "COG for IBM TF") })    # 0.27 secs
```



COG for IBM TF

```
##    user  system elapsed
##  49.124   0.461  49.683
```

```
# system.time({ distill.cog(dtm_ibm_idf, "COG for IBM IDF", 5, 5) })    # 0.57 secs
```

Func 6 - wordcloud + COG combo

Both the 2 major display aids we saw thus far - cog and wordcloud - have their pros and cons. Can we somehow combine them and get the best of both worlds, so to say? Read on.

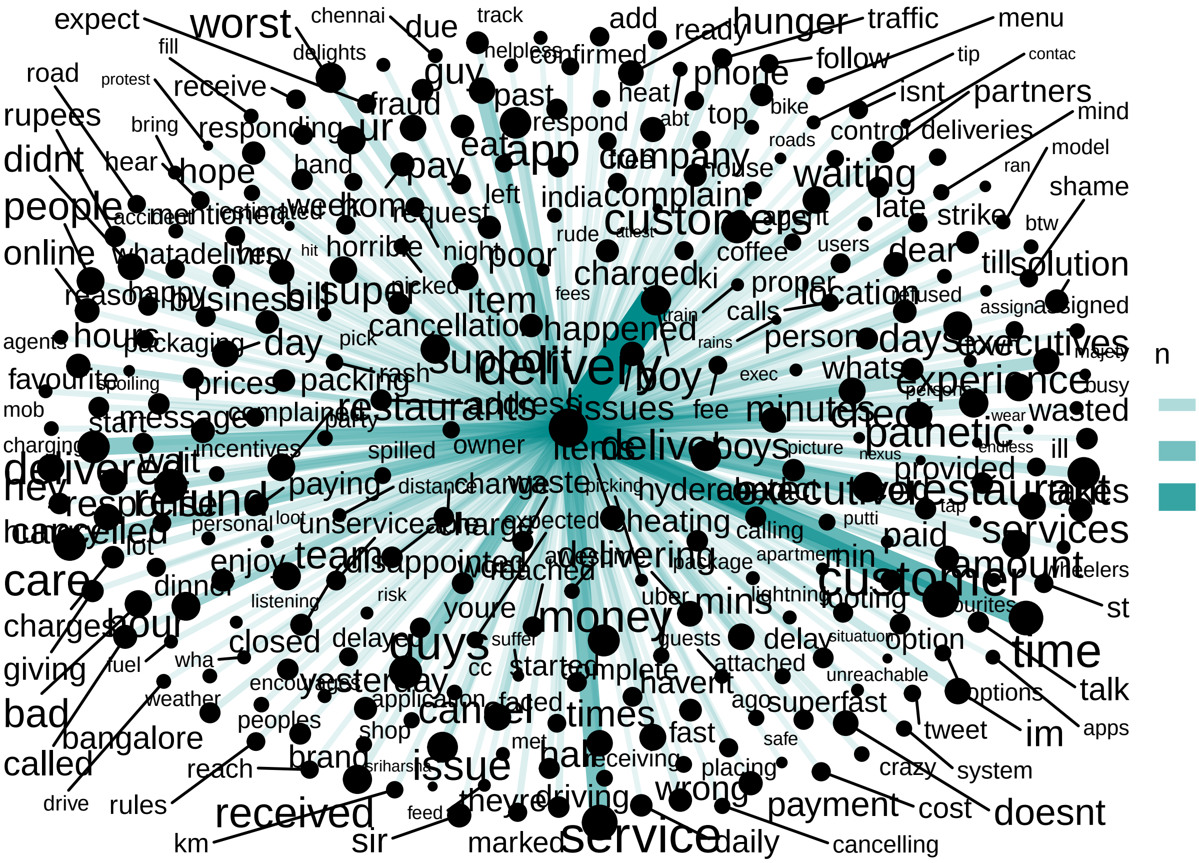
```
build_cog_ggraph <- function(corpus,   # text colmn only
                            max_edges = 150,
                            drop.stop_words=TRUE,
                            new.stopwords=NULL){

 # invoke libraries
 library(tidyverse)
 library(tidytext)
 library(widyr)
 library(ggraph)

 # build df from corpus
 corpus_df = data.frame(docID = seq(1:length(corpus)), text = corpus, stringsAsFactors=FALSE)

 # eval stopwords condn
 if (drop.stop_words == TRUE) {stop.words = unique(c(stop_words$word, new.stopwords)) %>%
   as_tibble() %>% rename(word=value)} else {stop.words = stop_words[2,]}

 # build word-pairs
 tokens <- corpus_df %>%

   # tokenize, drop stop_words etc
   unnest_tokens(word, text) %>% anti_join(stop.words)

   # pairwise_count() counts #token-pairs co-occuring in docs
 word_pairs = tokens %>% pairwise_count(word, docID, sort = TRUE, upper = FALSE)# %>% # head()

 word_counts = tokens %>% count( word,sort = T) %>% dplyr::rename( wordfr = n)

 word_pairs = word_pairs %>% left_join(word_counts, by = c("item1" = "word"))

 row_thresh = min(nrow(word_pairs), max_edges)

 # now plot
 set.seed(1234)
 # windows()
 plot_d <- word_pairs %>%
   filter(n >= 3) %>%
   top_n(row_thresh) %>%   igraph::graph_from_data_frame()

 dfwordcloud = data_frame(vertices = names(V(plot_d))) %>% left_join(word_counts, by = c("vertices"= "

 plot_obj = plot_d %>%   # graph object built!

   ggraph(layout = "fr") +
   geom_edge_link(aes(edge_alpha = n, edge_width = n), edge_colour = "cyan4")  +
   # geom_node_point(size = 5) +
   geom_node_point(size = log(dfwordcloud$wordfr)) +
   geom_node_text(aes(label = name), repel = TRUE,
                  point.padding = unit(0.2, "lines"),
                  size = 1 + log(dfwordcloud$wordfr)) +
   theme_void()

 return(plot_obj)    # must return func output

}  # func ends

# quick example for above using amazon nokia corpus
nokia = readLines('swiggy.txt')
system.time({ b0=build_cog_ggraph(nokia) })    # 0.36 secs
```

```
## Warning: Calling `as_tibble()` on a vector is discouraged, because the behavior is likely to change
## This warning is displayed once per session.
```

```
## Joining, by = "word"
```

```
## Selecting by wordfr
##    user  system elapsed
##   0.281   0.008   0.293
```

```
b0
```



Clearly, the most frequently occuring token above has taken epi-central node status. What if we dropped it? What new patterns might emerge? Points to ponder…

Well, that's it for now. I'm sure I have run out of time. If so, will pickup in the next session from where we leave off.

Sudhir