Text Analytics Group Assignment

Group - 4

10/09/2020

## Loading libraries

library(dplyr)

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

library(rvest)

## Loading required package: xml2

library(stringr)  
library(tidyverse)

## -- Attaching packages ----------------------------- tidyverse 1.3.0 --

## v ggplot2 3.3.2 v readr 1.3.1  
## v tibble 3.0.3 v purrr 0.3.4  
## v tidyr 1.1.0 v forcats 0.5.0

## -- Conflicts -------------------------------- tidyverse\_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x readr::guess\_encoding() masks rvest::guess\_encoding()  
## x dplyr::lag() masks stats::lag()  
## x purrr::pluck() masks rvest::pluck()

library(dplyr)  
library(SnowballC)  
library(textstem)

## Loading required package: koRpus.lang.en

## Loading required package: koRpus

## Loading required package: sylly

## For information on available language packages for 'koRpus', run  
##   
## available.koRpus.lang()  
##   
## and see ?install.koRpus.lang()

##   
## Attaching package: 'koRpus'

## The following object is masked from 'package:readr':  
##   
## tokenize

library(tm)

## Loading required package: NLP

##   
## Attaching package: 'NLP'

## The following object is masked from 'package:ggplot2':  
##   
## annotate

library(NLP)  
library(reshape2)

##   
## Attaching package: 'reshape2'

## The following object is masked from 'package:tidyr':  
##   
## smiths

library(ggplot2)  
library(tidyr)  
library(igraph)

##   
## Attaching package: 'igraph'

## The following objects are masked from 'package:purrr':  
##   
## compose, simplify

## The following object is masked from 'package:tidyr':  
##   
## crossing

## The following object is masked from 'package:tibble':  
##   
## as\_data\_frame

## The following objects are masked from 'package:dplyr':  
##   
## as\_data\_frame, groups, union

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

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

library(ggraph)  
library(tidytext)  
library(wordcloud)

## Loading required package: RColorBrewer

library(textdata)

## Scraping Reviews from FLIPKART

# Defining scraper function  
scrape <- function(url){  
flk <- read\_html(url)  
  
flk %>% html\_nodes("[class='\_2xg6Ul']") %>% html\_text() %>% gsub("[^\x01-\x7F]", "", .) -> ttl  
  
flk %>% html\_nodes("[class='qwjRop']") %>% html\_text() %>% gsub("READ MORE", "", .) %>% gsub("[^\x01-\x7F]", "", .)-> rv  
  
rvw <- data.frame("Title" = ttl, "Review" = rv)  
return(rvw)  
}  
  
# Generating links on which links for individual phones are found  
url <- c()  
for (i in seq(1,5)){  
 ur <- paste("https://www.flipkart.com/mobiles/mi~brand/pr?sid=tyy%2C4io&otracker=nmenu\_sub\_Electronics\_0\_Mi&page=",i) %>% gsub(" ", "", .)  
 url <- c(url,ur)  
}  
  
# Gathering urls on which scraping will be done  
url\_list <- c()  
for (i in url)  
{  
 flk <- read\_html(i)  
 ff <- flk %>% html\_nodes("[class='\_31qSD5']") %>% html\_attr("href")  
 j <- 1  
 nn <- c()  
 for (i in ff)  
 {  
 nn[j] <- paste("https://www.flipkart.com",i) %>% gsub(" ", "", .)  
 j <- j + 1  
 }  
 url\_list <- c(url\_list, nn)  
}  
  
# Defining blank data frame for capturing data  
textdata <- data.frame(Title=character(), Review=character())  
  
# Running scraper  
for (i in url\_list){  
textdata <- rbind(textdata,scrape(i))}

## Preprocessing the data frame for text data

colnames(textdata)

## [1] "Title" "Review"

str(textdata)

## 'data.frame': 1093 obs. of 2 variables:  
## $ Title : chr "Just wow!" "Awesome" "Just wow!" "Terrific" ...  
## $ Review: chr "This Is My Second Low Budget Mi Phone. First One Was 5A. I'm In Love With This Brand. Let's Talk About This One"| \_\_truncated\_\_ "Overall, the screen of the Redmi 8 is pretty good considering its a sub-Rs 10,000 price phone. Besides being a "| \_\_truncated\_\_ "I am spellbound after seeing this.What a value of money ... love you MI ...and also the package delivery servi"| \_\_truncated\_\_ "Awesome mobile. I've purchased it for my Mom... She is very happy with this SURPRISE... Guys don't take any Opt"| \_\_truncated\_\_ ...

# Load the data as a corpus  
docs <- VCorpus(VectorSource(textdata$Review))  
  
#Text transformation  
toSpace <- content\_transformer(function (x , pattern ) gsub(pattern, " ", x))  
docs <- tm\_map(docs, toSpace, "/")  
docs <- tm\_map(docs, toSpace, "@")  
docs <- tm\_map(docs, toSpace, "\\|")  
  
#Cleaning the text  
# Convert the text to lower case  
docs <- tm\_map(docs, content\_transformer(tolower))  
# Remove numbers  
docs <- tm\_map(docs, removeNumbers)  
# Remove english common stopwords  
docs <- tm\_map(docs, removeWords, stopwords("english"))  
  
# Remove punctuation  
docs <- tm\_map(docs, removePunctuation)  
# Eliminate extra white spaces  
docs <- tm\_map(docs, stripWhitespace)  
  
for(i in 1:100){  
 writeLines(as.character(docs[[i]]))  
}

## second low budget mi phone first one love brand talk onedesign awesome green killer red also superbattery awesome days backup normal users day heavy userscamera good bad finedisplay good use auto brightness outdoorheating problem fine still problemsound awesome loud clearcharging fine takes time charge mah w charger usual   
## overall screen redmi pretty good considering subrs price phone besides bright screen also bigger compared saw earlier comparable redmi phones redmi comes inch hd ips display screen resolution x pixelsbattery backup good like mh battery backup goodotherwise mobile good fabulous value money comparison handset good  
## spellbound seeing value money love mi also package delivery service packing quite good   
## awesome mobile purchased mom happy surprise guys take option make selection wonderful mobile   
## good phonenice display long battery life good camera gb ram large storage decent price highly recommend  
## smoothly phone works also light weightthin easily use daily lifeimportant thing sapparine blue colour just love whenever see thank much flipkart maximum hours fast delivery think opinion redmi value money phone   
## nice phone good battery life amazing design camera better really satisfied camera quality   
## redmi good phone good processor good gb good g ram  
## stunning look camera good battery powerful performance android pie display awesome value money   
## awesom product point view redmi must buy mobile phone moderate budget people battery display ram rom performs well speaker huge crystal clear voice look hot attractive phone dominates front high budget phones color varients better emerald green varient best awesome appreciated praised whoever see   
## second low budget mi phone first one love brand talk onedesign awesome green killer red also superbattery awesome days backup normal users day heavy userscamera good bad finedisplay good use auto brightness outdoorheating problem fine still problemsound awesome loud clearcharging fine takes time charge mah w charger usual   
## overall screen redmi pretty good considering subrs price phone besides bright screen also bigger compared saw earlier comparable redmi phones redmi comes inch hd ips display screen resolution x pixelsbattery backup good like mh battery backup goodotherwise mobile good fabulous value money comparison handset good  
## spellbound seeing value money love mi also package delivery service packing quite good   
## awesome mobile purchased mom happy surprise guys take option make selection wonderful mobile   
## good phonenice display long battery life good camera gb ram large storage decent price highly recommend  
## super budget mobile like type c port mah big batterygb gb excellent storage device super  
## smoothly phone works also light weightthin easily use daily lifeimportant thing sapparine blue colour just love whenever see thank much flipkart maximum hours fast delivery think opinion redmi value money phone   
## nice phone good battery life amazing design camera better really satisfied camera quality   
## redmi good phone good processor good gb good g ram  
## stunning look camera good battery powerful performance android pie display awesome value money   
## second low budget mi phone first one love brand talk onedesign awesome green killer red also superbattery awesome days backup normal users day heavy userscamera good bad finedisplay good use auto brightness outdoorheating problem fine still problemsound awesome loud clearcharging fine takes time charge mah w charger usual   
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## spellbound seeing value money love mi also package delivery service packing quite good   
## awesome mobile purchased mom happy surprise guys take option make selection wonderful mobile   
## good phonenice display long battery life good camera gb ram large storage decent price highly recommend  
## smoothly phone works also light weightthin easily use daily lifeimportant thing sapparine blue colour just love whenever see thank much flipkart maximum hours fast delivery think opinion redmi value money phone   
## nice phone good battery life amazing design camera better really satisfied camera quality   
## redmi good phone good processor good gb good g ram  
## stunning look camera good battery powerful performance android pie display awesome value money   
## awesom product point view redmi must buy mobile phone moderate budget people battery display ram rom performs well speaker huge crystal clear voice look hot attractive phone dominates front high budget phones color varients better emerald green varient best awesome appreciated praised whoever see   
## second low budget mi phone first one love brand talk onedesign awesome green killer red also superbattery awesome days backup normal users day heavy userscamera good bad finedisplay good use auto brightness outdoorheating problem fine still problemsound awesome loud clearcharging fine takes time charge mah w charger usual   
## overall screen redmi pretty good considering subrs price phone besides bright screen also bigger compared saw earlier comparable redmi phones redmi comes inch hd ips display screen resolution x pixelsbattery backup good like mh battery backup goodotherwise mobile good fabulous value money comparison handset good  
## spellbound seeing value money love mi also package delivery service packing quite good   
## awesome mobile purchased mom happy surprise guys take option make selection wonderful mobile   
## good phonenice display long battery life good camera gb ram large storage decent price highly recommend  
## super budget mobile like type c port mah big batterygb gb excellent storage device super  
## smoothly phone works also light weightthin easily use daily lifeimportant thing sapparine blue colour just love whenever see thank much flipkart maximum hours fast delivery think opinion redmi value money phone   
## nice phone good battery life amazing design camera better really satisfied camera quality   
## redmi good phone good processor good gb good g ram  
## stunning look camera good battery powerful performance android pie display awesome value money   
## ordered mobile husband liked lot nice moddle look vise also good battery back good camera quality good thank u flipkart delivery time   
## awesome need buy   
## good  
## like   
## super battery backup value money fastest delivery thank flipkart  
## lovely phone  
## product good camera good overal ok  
## super phone quality good performancesuper camera batteryvalue money   
## nice products  
## good one price slightly high  
## awesome display new type phone camera awesome performance better delivered time amazing must buy  
## excellent camera excellent performance redmi given tough competition brands pricevery good display lag free pubg finally worth money  
## giving review month usage hope helps usual budget phone redmi will definitely feel soon hold phone hand upgrade phone budget k phone will fill difference instantly use using oneplus might feel redmi tried everything give premium quality phone still lacks behind oneplus phone aspectsdisplay amoled displa  
## nice phone battery good camera good front camera excellent back just average night mode cool product perfect  
## detailed review days use k pro killer opossitivessd provides dazzling performance will work like charm even one second lagcamera best market price range pop also good enoughamoled display just amazing screen vibrant p videos will look amazing full scale display also good curve bottom filling display fullymeans clearance bottom even though   
## mobile best battery draning fast camera quality good mp zoom photo performance good  
## good photography mobile awesome features low light photography cool description must important give review phone cool phone flagship killer belive hype true master pubg users must buy phone lag free mobile fps hdr support ping mobile loved   
## says k pro overpriced nincompoopprosexcellent camera portrait mode awesomelow light camera good one plus bettersd beastbest processordesign awesomeevery colour veriant someting specialdisplay awesome can watch netflix hdl support boxapp drawer also available box running poco launcher charging time hr min cons w charger box ir  
## phone looks good unique degine fluid performancecameras expectations love triple camerasdisplay gorgeousfast charging box charger pretty good satisfiedspeakers loud enough least performance top notch snapdragon chipset also network aggression dual gpsearpeas also loud enough first impressions pretty good  
## bought boyfriend loving review using entry level smartphone since last years perception like others device overpriced using couple weeks totally changed opinion worth every single penny spent flipkart delivery got delivered th dayperformance fast score untutudisplay play ap k video   
## well awesome phone battery life just amazing got awesome display well performance camera quality good enough great product price  
## genuine review camera phone camera ok dont expect much camera buget can still give u good picturesperformance think performance handle daily task easily bht handle heavy games like pubg bht can run pubg lite smoothly also functiong goodbattery battery backup good can easily give u days battery backup easily displaydisplay good much resposive sometime lags littlr bit g  
## bought family member quite happy product supports dual sim camera quality appropriate honestly battery back good though isnt obvious mi device  
## phone value money low budget phone dont expect much good phone process application smoothly battery life becoming imo days phone design battery camera things tht can improved battery lasts long full brightness camera decent iphone camera still job done good light abd exposure will help  
## functions good phone heavy slip hand easily drawbackmi said aura grip design grip forms phone hand true   
## good  
## nice  
## bad product faced charging issue  
## phone cover accessories provided quality charger also good  
## nice  
## gifted father nd smart phone simple expectations trust beyond expectations cool buget oriented device good camera battery backup normal daily usagecamera display battery value money specs   
## best value money mobile camera awesome battery back good work smooth  
## overall good product rate thenfront camera rear camera display design performance overall good product range lack finger print sensor flipkart site page written full hd display box nthg specified know last least fast delivery flipkart thanq flipkart   
## camera good everything else just fine according price nice built quality looks display battery os processor good lite usage   
## super mobile must buy good free fire also smoothly running  
## nice product  
## vary good quality  
## nice  
## good phone budget  
## great product redmi thankyou fastest delivery expected will get product soon thankyou   
## ordered mobile husband liked lot nice moddle look vise also good battery back good camera quality good thank u flipkart delivery time   
## awesome need buy   
## good  
## like   
## super battery backup value money fastest delivery thank flipkart  
## lovely phone  
## product good camera good overal ok  
## super phone quality good performancesuper camera batteryvalue money   
## nice products  
## good one price slightly high  
## super  
## awesome product liked charging slow comes w charger use slow charging  
## really nice mobile camera glorious style   
## gifted father nd smart phone simple expectations trust beyond expectations cool buget oriented device good camera battery backup normal daily usagecamera display battery value money specs   
## best value money mobile camera awesome battery back good work smooth  
## overall good product rate thenfront camera rear camera display design performance overall good product range lack finger print sensor flipkart site page written full hd display box nthg specified know last least fast delivery flipkart thanq flipkart   
## camera good everything else just fine according price nice built quality looks display battery os processor good lite usage   
## super mobile must buy good free fire also smoothly running  
## nice product  
## vary good quality

# Build a term-document matrix

dtm <- TermDocumentMatrix(docs)  
m <- as.matrix(dtm)  
v <- sort(rowSums(m),decreasing=TRUE)  
d <- data.frame(word = names(v),freq=v)  
head(d, 10)

## word freq  
## good good 940  
## phone phone 755  
## camera camera 722  
## battery battery 320  
## nice nice 309  
## quality quality 276  
## price price 264  
## awesome awesome 261  
## display display 250  
## mobile mobile 233

# Generate the Word cloud  
set.seed(1234)  
wordcloud(words = d$word, freq = d$freq, min.freq = 1,  
 max.words=200, random.order=FALSE, rot.per=0.35,   
 colors=brewer.pal(8, "Dark2"))

## Warning in wordcloud(words = d$word, freq = d$freq, min.freq = 1, max.words =  
## 200, : provided could not be fit on page. It will not be plotted.

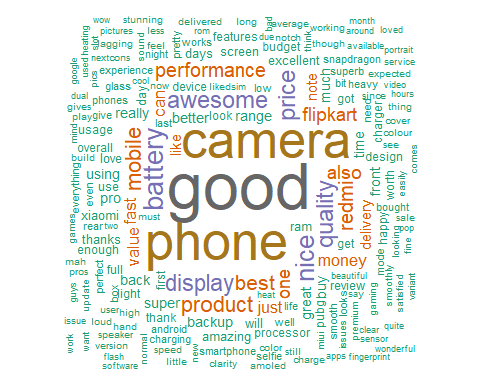
## Warning in wordcloud(words = d$word, freq = d$freq, min.freq = 1, max.words =  
## 200, : white could not be fit on page. It will not be plotted.

## Warning in wordcloud(words = d$word, freq = d$freq, min.freq = 1, max.words =  
## 200, : writing could not be fit on page. It will not be plotted.

## Warning in wordcloud(words = d$word, freq = d$freq, min.freq = 1, max.words =  
## 200, : lasts could not be fit on page. It will not be plotted.

## Warning in wordcloud(words = d$word, freq = d$freq, min.freq = 1, max.words =  
## 200, : purchased could not be fit on page. It will not be plotted.

## Warning in wordcloud(words = d$word, freq = d$freq, min.freq = 1, max.words =  
## 200, : recommend could not be fit on page. It will not be plotted.



names(textdata$Review) = "text"  
textdata<-mutate(textdata,text= as.character(Review))  
data\_bigrams <- textdata %>%  
 unnest\_tokens(bigram, text, token = "ngrams", n = 2)%>%  
 count(bigram,sort=TRUE)  
head(data\_bigrams,50)

## bigram n  
## 1 is good 171  
## 2 this phone 163  
## 3 camera is 162  
## 4 this price 151  
## 5 is not 130  
## 6 in this 119  
## 7 quality is 108  
## 8 phone is 102  
## 9 the phone 101  
## 10 for money 98  
## 11 it is 95  
## 12 camera quality 94  
## 13 is very 94  
## 14 value for 93  
## 15 very good 93  
## 16 good and 88  
## 17 i am 86  
## 18 is a 86  
## 19 of the 83  
## 20 in the 81  
## 21 price range 81  
## 22 at this 79  
## 23 very nice 78  
## 24 battery backup 74  
## 25 the camera 73  
## 26 the best 71  
## 27 redmi note 70  
## 28 display is 69  
## 29 is also 69  
## 30 this is 69  
## 31 performance is 68  
## 32 is the 63  
## 33 with the 62  
## 34 to buy 58  
## 35 good but 56  
## 36 too good 55  
## 37 i have 53  
## 38 and the 52  
## 39 battery life 52  
## 40 is awesome 52  
## 41 for the 49  
## 42 good battery 49  
## 43 this mobile 49  
## 44 is just 48  
## 45 thank you 48  
## 46 camera and 46  
## 47 front camera 46  
## 48 good camera 45  
## 49 nice phone 45  
## 50 phone in 45

# Deleting stop words  
bigrams\_separated <- data\_bigrams %>%  
 separate(bigram, c("word1", "word2"), sep = " ")  
  
bigrams\_filtered <- bigrams\_separated %>%  
 filter(!word1 %in% stop\_words$word) %>%  
 filter(!word2 %in% stop\_words$word)  
  
# New bigram counts:  
bigram\_counts <- bigrams\_filtered %>%   
 count(word1, word2, sort = TRUE)

## Using `n` as weighting variable  
## i Quiet this message with `wt = n` or count rows with `wt = 1`

head(bigram\_counts,50)

## word1 word2 n  
## 1 camera quality 94  
## 2 price range 81  
## 3 battery backup 74  
## 4 redmi note 70  
## 5 battery life 52  
## 6 front camera 46  
## 7 nice phone 45  
## 8 awesome phone 42  
## 9 rear camera 38  
## 10 fast delivery 36  
## 11 nice mobile 29  
## 12 note 7 29  
## 13 6gb ram 25  
## 14 build quality 25  
## 15 fast charger 25  
## 16 nice product 25  
## 17 note 5 25  
## 18 7 pro 23  
## 19 2 days 22  
## 20 mobile phone 22  
## 21 night mode 22  
## 22 display quality 20  
## 23 low light 20  
## 24 phone camera 20  
## 25 5 pro 19  
## 26 k20 pro 19  
## 27 amoled display 18  
## 28 google camera 18  
## 29 48 mp 17  
## 30 awesome camera 17  
## 31 selfie camera 17  
## 32 1 month 16  
## 33 mind blowing 16  
## 34 battery performance 15  
## 35 pros 1 15  
## 36 super fast 15  
## 37 excellent camera 14  
## 38 gorilla glass 14  
## 39 nice camera 14  
## 40 redmi 5a 14  
## 41 redmi 8 14  
## 42 note 4 13  
## 43 portrait mode 13  
## 44 4000 mah 12  
## 45 4gb ram 12  
## 46 charging time 12  
## 47 heavy usage 12  
## 48 mi phone 12  
## 49 superb phone 12  
## 50 white color 12

## combine words  
bigrams\_united <- bigrams\_filtered %>%  
 unite(bigram, word1, word2, sep = " ")  
head(bigrams\_united, 50)

## bigram n  
## 1 camera quality 94  
## 2 price range 81  
## 3 battery backup 74  
## 4 redmi note 70  
## 5 battery life 52  
## 6 front camera 46  
## 7 nice phone 45  
## 8 awesome phone 42  
## 9 rear camera 38  
## 10 fast delivery 36  
## 11 nice mobile 29  
## 12 note 7 29  
## 13 6gb ram 25  
## 14 build quality 25  
## 15 fast charger 25  
## 16 nice product 25  
## 17 note 5 25  
## 18 7 pro 23  
## 19 2 days 22  
## 20 mobile phone 22  
## 21 night mode 22  
## 22 display quality 20  
## 23 low light 20  
## 24 phone camera 20  
## 25 5 pro 19  
## 26 k20 pro 19  
## 27 amoled display 18  
## 28 google camera 18  
## 29 48 mp 17  
## 30 awesome camera 17  
## 31 selfie camera 17  
## 32 1 month 16  
## 33 mind blowing 16  
## 34 battery performance 15  
## 35 pros 1 15  
## 36 super fast 15  
## 37 excellent camera 14  
## 38 gorilla glass 14  
## 39 nice camera 14  
## 40 redmi 5a 14  
## 41 redmi 8 14  
## 42 note 4 13  
## 43 portrait mode 13  
## 44 4000 mah 12  
## 45 4gb ram 12  
## 46 charging time 12  
## 47 heavy usage 12  
## 48 mi phone 12  
## 49 superb phone 12  
## 50 white color 12

# SENTIMENT ANALYSIS

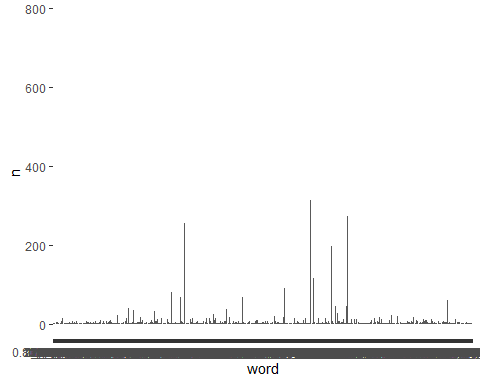
# Tokenise  
textdata$Review<-as.character(textdata$Review)  
review\_tidy <- textdata %>% unnest\_tokens(word, Review)  
# View(textdata)  
# View(review\_tidy)  
  
# Count  
review\_tidy %>% count(word) %>% arrange(desc(n)) %>% head(., 50)

## word n  
## 1 is 1623  
## 2 the 1146  
## 3 and 986  
## 4 good 945  
## 5 phone 765  
## 6 this 757  
## 7 camera 722  
## 8 a 662  
## 9 it 642  
## 10 i 638  
## 11 for 610  
## 12 in 607  
## 13 to 500  
## 14 of 455  
## 15 very 439  
## 16 but 390  
## 17 with 377  
## 18 not 368  
## 19 battery 327  
## 20 nice 313  
## 21 you 297  
## 22 quality 275  
## 23 price 273  
## 24 awesome 264  
## 25 display 255  
## 26 product 236  
## 27 mobile 231  
## 28 as 228  
## 29 best 222  
## 30 my 221  
## 31 on 217  
## 32 so 212  
## 33 are 209  
## 34 redmi 206  
## 35 at 204  
## 36 performance 197  
## 37 it's 193  
## 38 that 192  
## 39 also 188  
## 40 flipkart 181  
## 41 have 174  
## 42 one 174  
## 43 all 164  
## 44 5 160  
## 45 can 156  
## 46 fast 155  
## 47 no 153  
## 48 just 152  
## 49 money 145  
## 50 1 142

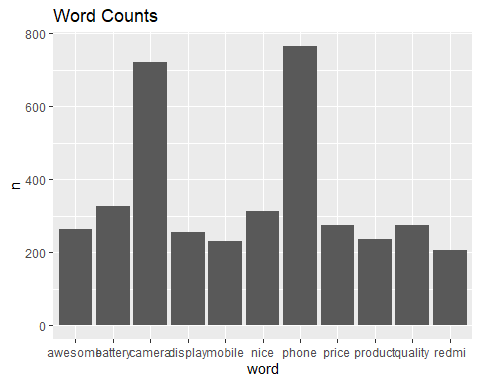
# Remove stop words -  
# http://snowball.tartarus.org/algorithms/english/stop.txt  
# http://www.lextek.com/manuals/onix/stopwords1.html  
  
review\_tidy2 <- review\_tidy %>% anti\_join(stop\_words)

## Joining, by = "word"

# Count  
word\_count<-review\_tidy2 %>% count(word) %>% arrange(desc(n))  
  
# Visualization  
ggplot(word\_count, aes(x = word, y = n)) + geom\_col()



# Count  
word\_count2 <- review\_tidy2 %>% count(word) %>% filter(n>200) %>% arrange(desc(n))  
ggplot(word\_count2, aes(x = word, y = n)) + geom\_col() + ggtitle("Word Counts")



# SENTIMENT Analysis  
get\_sentiments("bing")

## # A tibble: 6,786 x 2  
## word sentiment  
## <chr> <chr>   
## 1 2-faces negative   
## 2 abnormal negative   
## 3 abolish negative   
## 4 abominable negative   
## 5 abominably negative   
## 6 abominate negative   
## 7 abomination negative   
## 8 abort negative   
## 9 aborted negative   
## 10 aborts negative   
## # ... with 6,776 more rows

get\_sentiments("afinn")

## # A tibble: 2,477 x 2  
## word value  
## <chr> <dbl>  
## 1 abandon -2  
## 2 abandoned -2  
## 3 abandons -2  
## 4 abducted -2  
## 5 abduction -2  
## 6 abductions -2  
## 7 abhor -3  
## 8 abhorred -3  
## 9 abhorrent -3  
## 10 abhors -3  
## # ... with 2,467 more rows

get\_sentiments("loughran")

## # A tibble: 4,150 x 2  
## word sentiment  
## <chr> <chr>   
## 1 abandon negative   
## 2 abandoned negative   
## 3 abandoning negative   
## 4 abandonment negative   
## 5 abandonments negative   
## 6 abandons negative   
## 7 abdicated negative   
## 8 abdicates negative   
## 9 abdicating negative   
## 10 abdication negative   
## # ... with 4,140 more rows

get\_sentiments("nrc")

## # A tibble: 13,901 x 2  
## word sentiment  
## <chr> <chr>   
## 1 abacus trust   
## 2 abandon fear   
## 3 abandon negative   
## 4 abandon sadness   
## 5 abandoned anger   
## 6 abandoned fear   
## 7 abandoned negative   
## 8 abandoned sadness   
## 9 abandonment anger   
## 10 abandonment fear   
## # ... with 13,891 more rows

sentiment\_review1 <- review\_tidy2 %>% inner\_join(get\_sentiments("bing"))

## Joining, by = "word"

sentiment\_review1<-sentiment\_review1 %>% count(sentiment)%>% filter(n>200)%>% arrange(desc(n))  
  
sentiment\_review2 <- review\_tidy2 %>% inner\_join(get\_sentiments("loughran"))

## Joining, by = "word"

sentiment\_review2<-sentiment\_review2 %>% count(sentiment)%>% filter(n>200)%>% arrange(desc(n))  
  
sentiment\_review3 <- review\_tidy2 %>% inner\_join(get\_sentiments("nrc"))

## Joining, by = "word"

sentiment\_review3<-sentiment\_review3 %>% count(sentiment)%>% filter(n>200)%>% arrange(desc(n))  
  
sentiment\_review3 %>% count(sentiment) %>% arrange(desc(n))

## Using `n` as weighting variable  
## i Quiet this message with `wt = n` or count rows with `wt = 1`

## sentiment n  
## 1 positive 1949  
## 2 anticipation 1269  
## 3 trust 1125  
## 4 negative 926  
## 5 joy 924  
## 6 anger 727  
## 7 surprise 368  
## 8 sadness 275

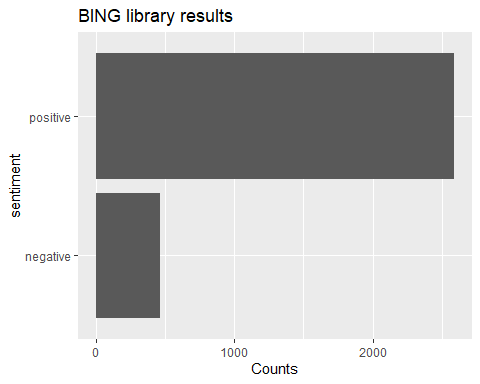
pos\_neg <- sentiment\_review3 %>% count(sentiment) %>% filter(sentiment %in% c("positive", "negative"))

## Using `n` as weighting variable  
## i Quiet this message with `wt = n` or count rows with `wt = 1`

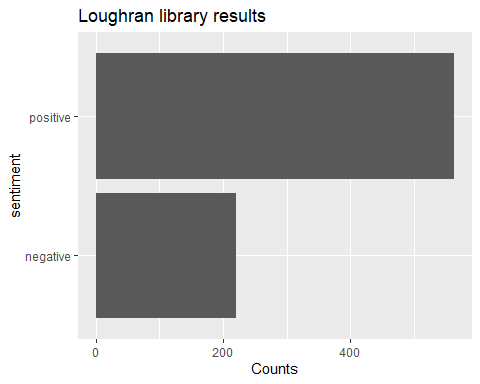
pos\_neg

## sentiment n  
## 1 negative 926  
## 2 positive 1949

ggplot(sentiment\_review1, aes(x = n, y = sentiment)) + geom\_col() + ggtitle("BING library results") + xlab("Counts")



ggplot(sentiment\_review2, aes(x = n, y = sentiment)) + geom\_col() + ggtitle("Loughran library results") + xlab("Counts")



ggplot(sentiment\_review3, aes(x = n, y = sentiment)) + geom\_col() + ggtitle("NRC library results") + xlab("Counts")

