Twitter zzh-gj-jz association

2022-05-25

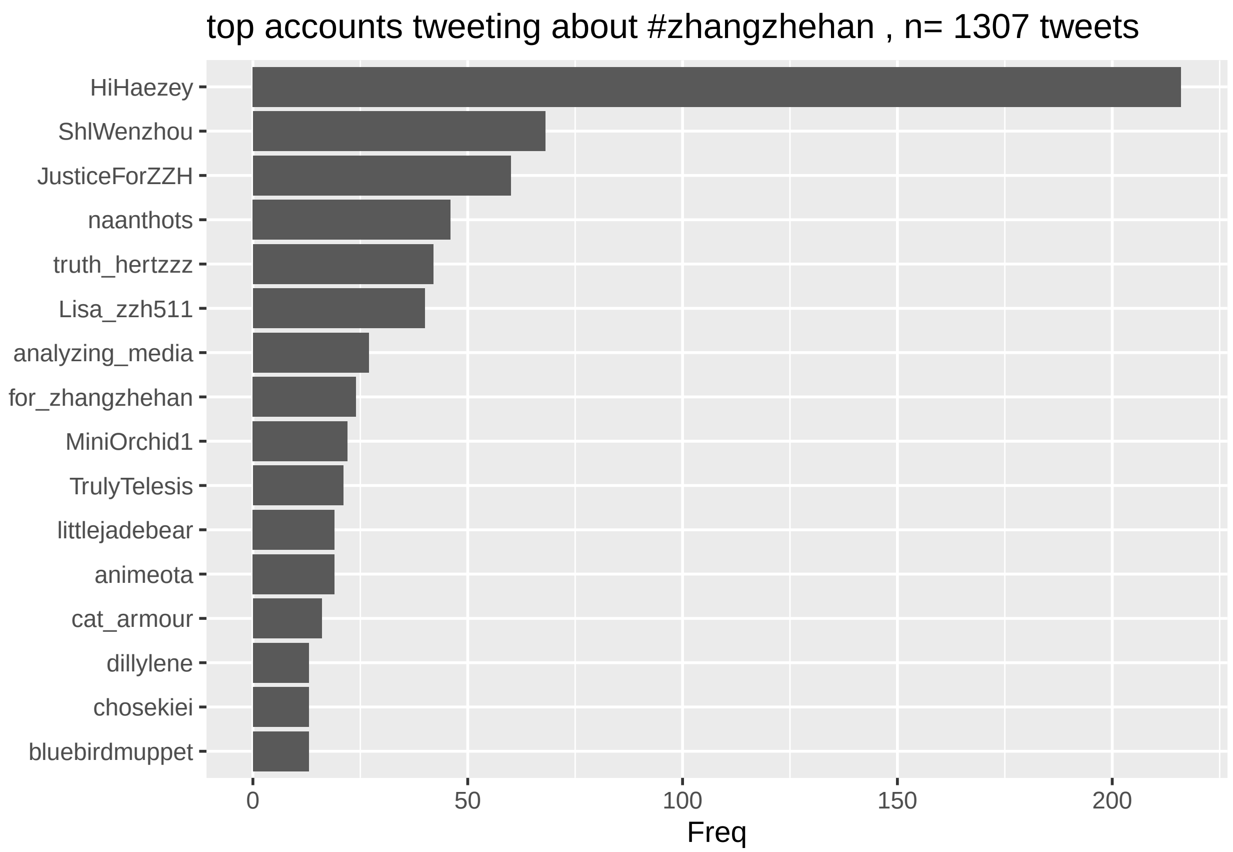
In this analysis I will first extract tweets mentioning "#zhangzhehan", "#gongjun" or "#junzhe" and then check the overlap between accounts tweeting about these topics. After playing around a bit I decided to use only hashtags instead of full names to focus on dedicated tweets instead of casual mentions.

First let's get the tweets via Twitter API. Please note that there is a rate limit of up to 18000 tweets per day. Nonetheless, I never manage to get the maximum of 6000 tweets per query for some reason. Tweet search is also limited to the last 4 days.

I will then plot the accounts with the most tweets about these topics.

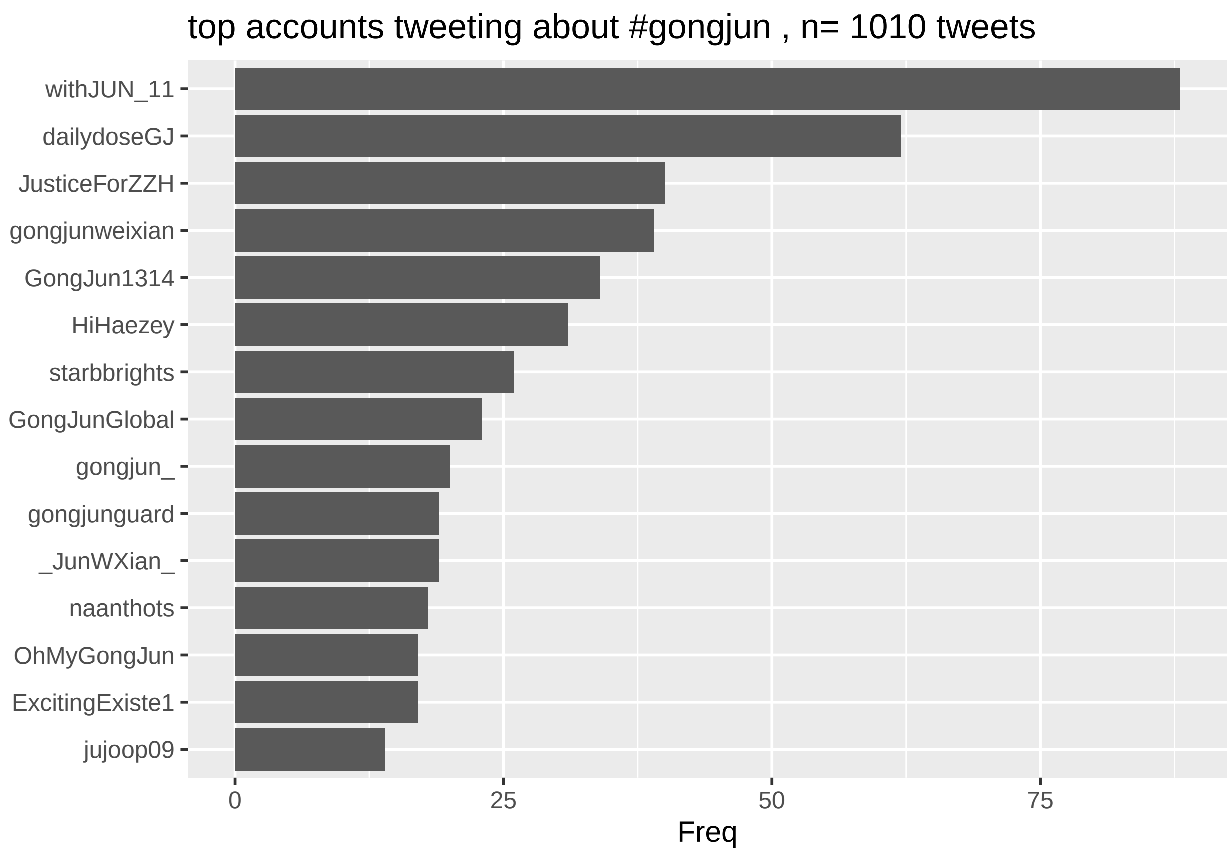
```
###extract tweets

tweets_extract_plot<-function(words,title){
  tweets<-search_tweets2(words,n = 6000,lang = "en",include_rts = FALSE)
  n_tweets<-nrow(tweets)
  stats<-paste(title,collapse=" ")
  stats<-paste(stats,", n=",n_tweets,"tweets")

  plot<-table(tweets$screen_name)%>%
    as.data.frame() %>%
    arrange(desc(Freq)) %>%
    top_n(15) %>%
    mutate(Var1 = reorder(Var1, Freq)) %>%
    ggplot(aes(x = Var1, y = Freq)) +
    geom_col() +
    xlab(NULL) +
    coord_flip() +
    ggtitle(paste("top accounts tweeting about",stats))
  print(plot)
  return(tweets)
}
zzh_tweets<-tweets_extract_plot(c("#zhangzhehan"),"#zhangzhehan")
```

```
## Selecting by Freq
```



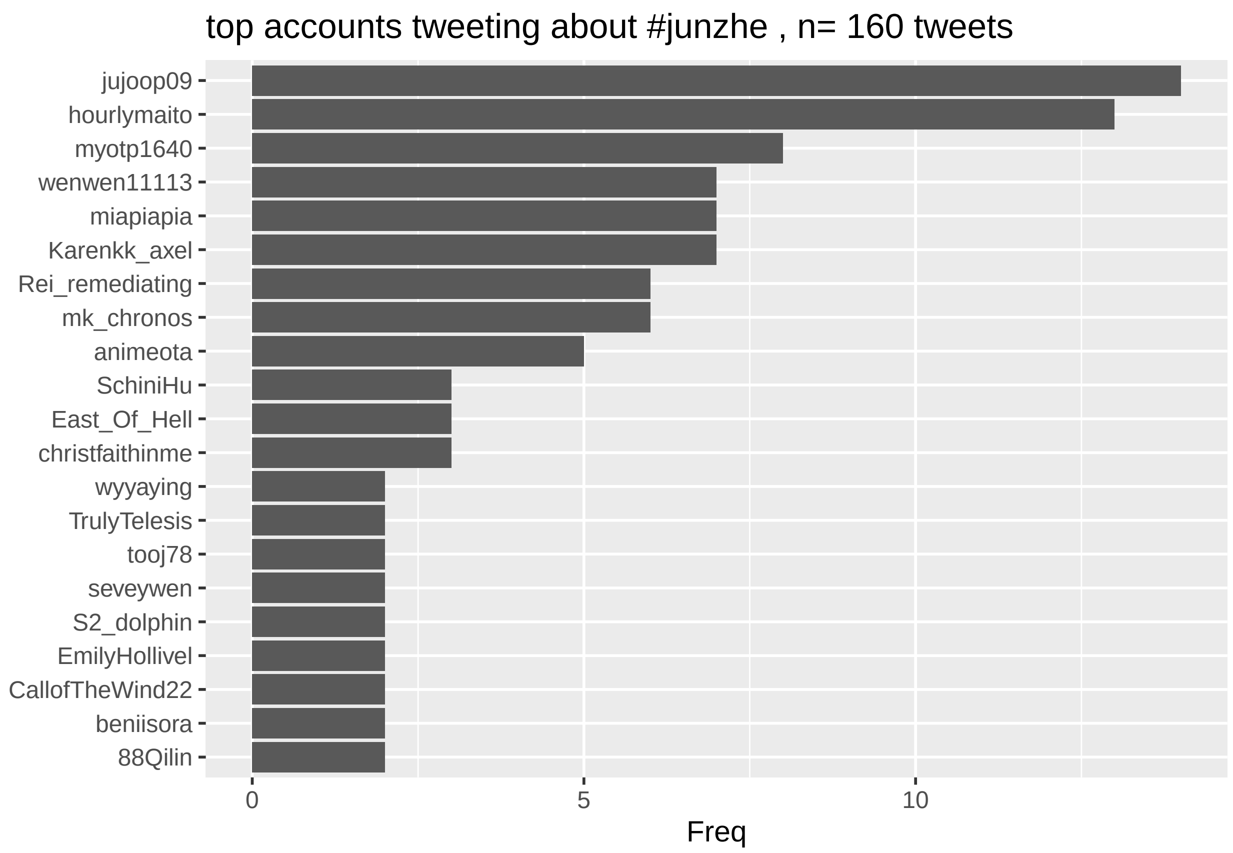
```
gj_tweets<-tweets_extract_plot(c("#gongjun"),"#gongjun")
```

```
## Selecting by Freq
```



```
jz_tweets<-tweets_extract_plot(c("#junzhe"),"#junzhe")
```

```
## Selecting by Freq
```



Quick info on which timespan the datasets cover and how many tweets per day

```
#calculate rate of tweets per hour
tweet_stats<-function(data,title){
  print(paste("dataset:",title))
  print(paste("number of tweets:",nrow(data)))
  start<-data[nrow(data),]$created_at
  end<-data[1,]$created_at
  print(paste("start:",start))
  print(paste("end:",end))
  diff = end - start
  print(diff)
  #tweets per day
  tw_p_day<-round(nrow(data)/as.numeric(diff),2)
  print(paste("tweets per day:",tw_p_day))
  return(tw_p_day)
}

st_zzh<-tweet_stats(zzh_tweets,"#zhangzhehan")
```

```
## [1] "dataset: #zhangzhehan"
## [1] "number of tweets: 1307"
## [1] "start: 2022-05-17 16:00:20"
## [1] "end: 2022-05-25 17:11:34"
## Time difference of 8.049468 days
## [1] "tweets per day: 162.37"
```

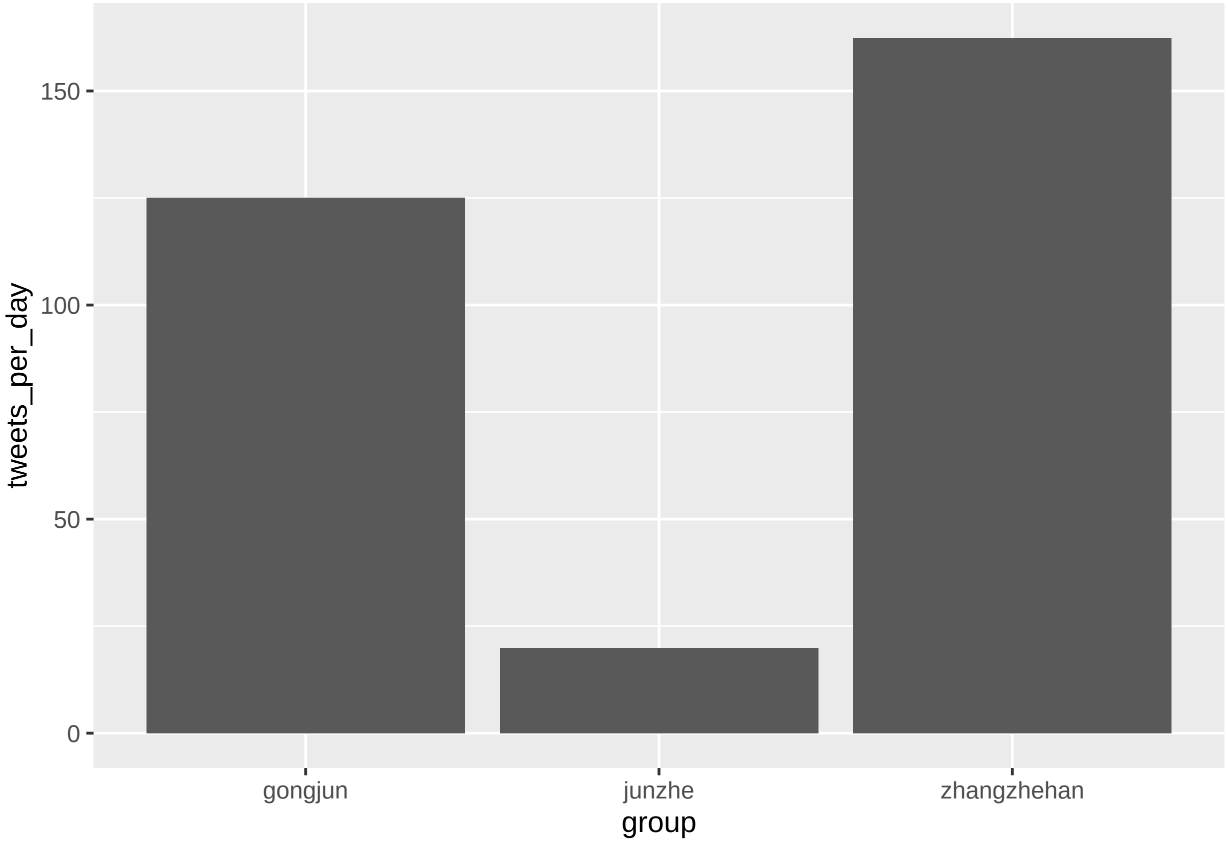
```
st_gj<-tweet_stats(gj_tweets,"#gongjun")
```

```
## [1] "dataset: #gongjun"
## [1] "number of tweets: 1010"
## [1] "start: 2022-05-17 15:26:41"
## [1] "end: 2022-05-25 17:11:34"
## Time difference of 8.072836 days
## [1] "tweets per day: 125.11"
```

```
st_jz<-tweet_stats(jz_tweets,"#junzhe")
```

```
## [1] "dataset: #junzhe"
## [1] "number of tweets: 160"
## [1] "start: 2022-05-17 15:07:35"
## [1] "end: 2022-05-25 16:24:22"
## Time difference of 8.053322 days
## [1] "tweets per day: 19.87"
```

```
bargraph<-data.frame(group=c("zhangzhehan","gongjun","junzhe"),tweets_per_day=c(st_zzh,st_gj,st_jz))

ggplot(bargraph,aes(x=group,y=tweets_per_day))+
  geom_col()
```



Next let's make a Venn diagram to see the overlap between accounts tweeting about "Junzhe" "Zhang Zhehan" or "Gong Jun". I have to use 2 Venn diagram packages because gplots gives me the numbers+intersections but only venneuler lets me make a beautiful diagram with proportional circle areas.

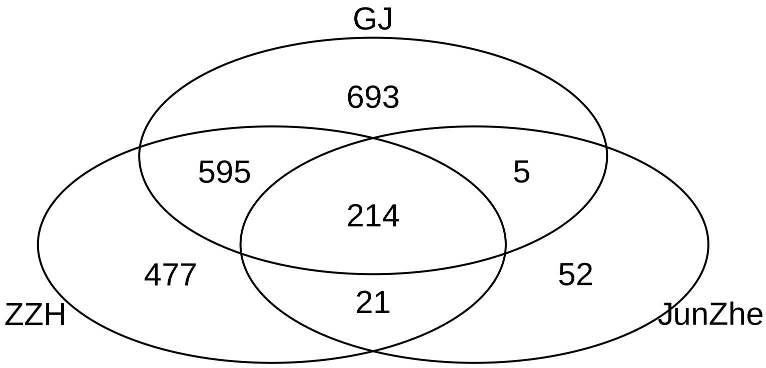
Note: This plot is not based on tweets containing the respective topics in combination. Instead it plots, e.g. how often accounts mentioning "ZZH" have also mentioned "Gong Jun", this can be in the same or different tweets.

```
###Venn diagram
library(gplots)
```

```
##
## Attaching package: 'gplots'
```

```
## The following object is masked from 'package:stats':
##
##     lowess
```

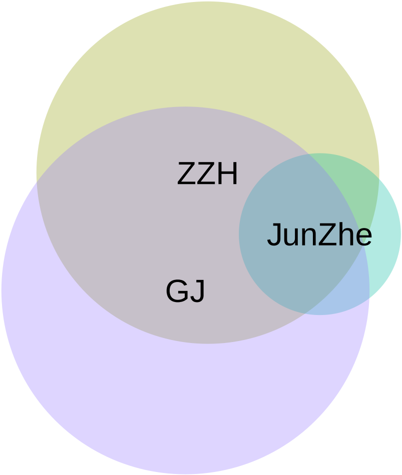
```
x <- list("ZZH" = zzh_tweets$screen_name,
          "JunZhe" = jz_tweets$screen_name,
          "GJ" = gj_tweets$screen_name)
v.table <- venn(x)
```



```
x <- attr(v.table,"intersections")
names_venn<-sapply(seq_along(x), function(i) paste(names(x)[[i]]))
numbers_venn<-lapply(seq_along(x), function(i) length(x[[i]]))
names_venn<-str_replace(names_venn, ":", "&")
names_venn<-str_replace(names_venn, ":", "&")
numbers_venn<-as.numeric(numbers_venn)
names(numbers_venn)<-names_venn


library(venneuler)
```

```
## Loading required package: rJava
```

```
v <- venneuler(numbers_venn)
plot(v)
```

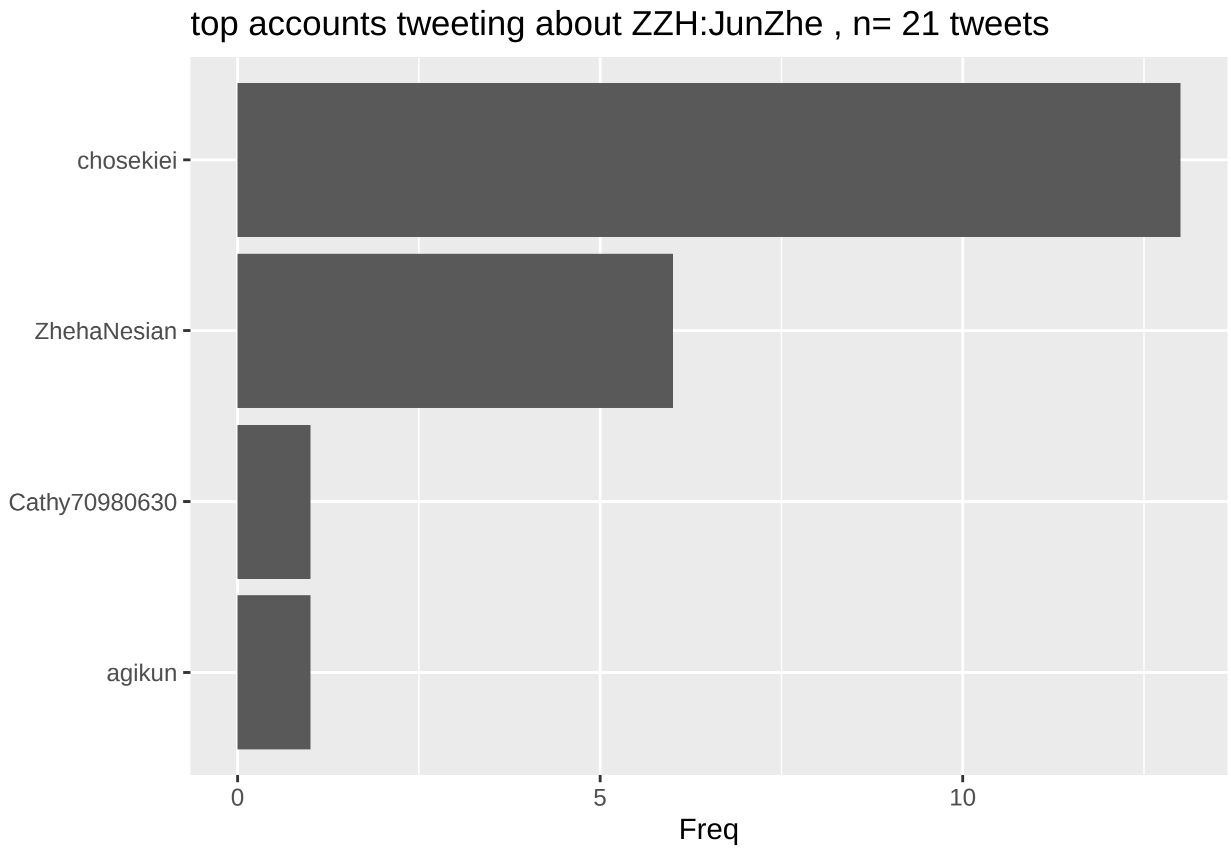


Finally let's plot the top accounts tweeting about the respective topics+combinations. In these plots, for example the "Zhang Zhehan" accounts are the "pure" accounts not mentioning the other two topics.

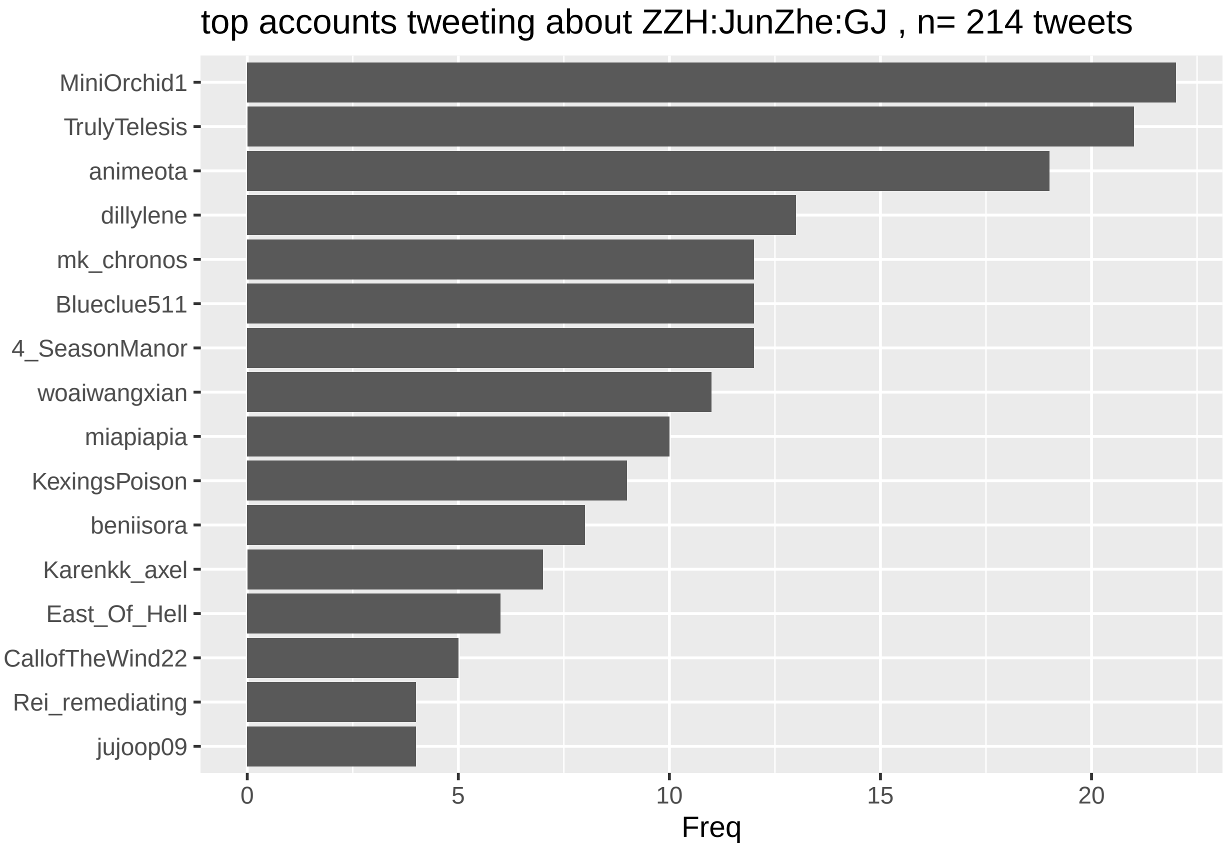
```
###top accounts n venn diagram slices
topgraph<-function(index,data){
  n_tweets<-length(data)
  table(data)%>%
    as.data.frame() %>%
    arrange(desc(Freq)) %>%
    top_n(15) %>%
    mutate(data = reorder(data, Freq)) %>%
    ggplot(aes(x = data, y = Freq)) +
    geom_col() +
    xlab(NULL) +
    coord_flip() +
    ggtitle(paste("top accounts tweeting about",index,", n=",n_tweets,"tweets"))
}


x <- attr(v.table,"intersections")
lapply(seq_along(x), function(i) topgraph(names(x)[[i]], x[[i]]))
```

```
## Selecting by Freq
## Selecting by Freq
## Selecting by Freq
## Selecting by Freq
## Selecting by Freq
## Selecting by Freq
## Selecting by Freq
```

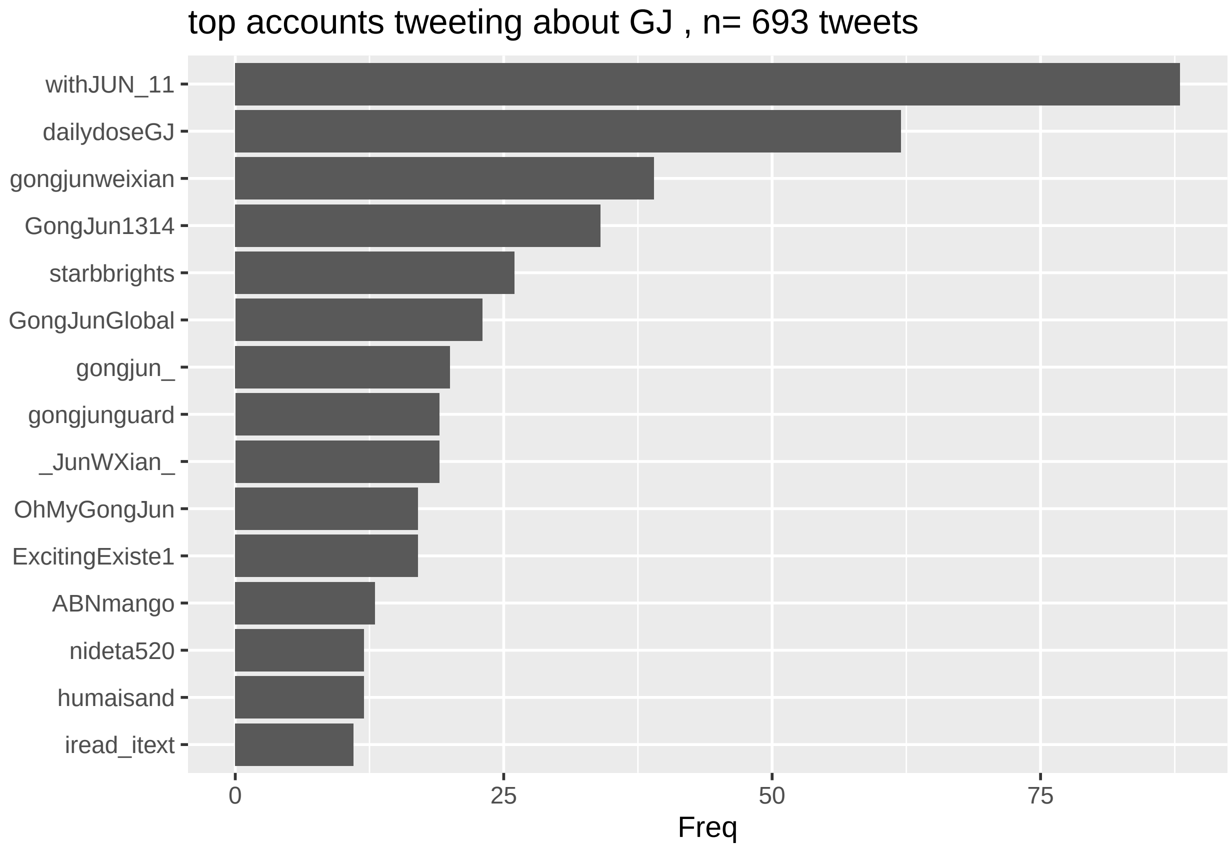
```
## [[1]]
```



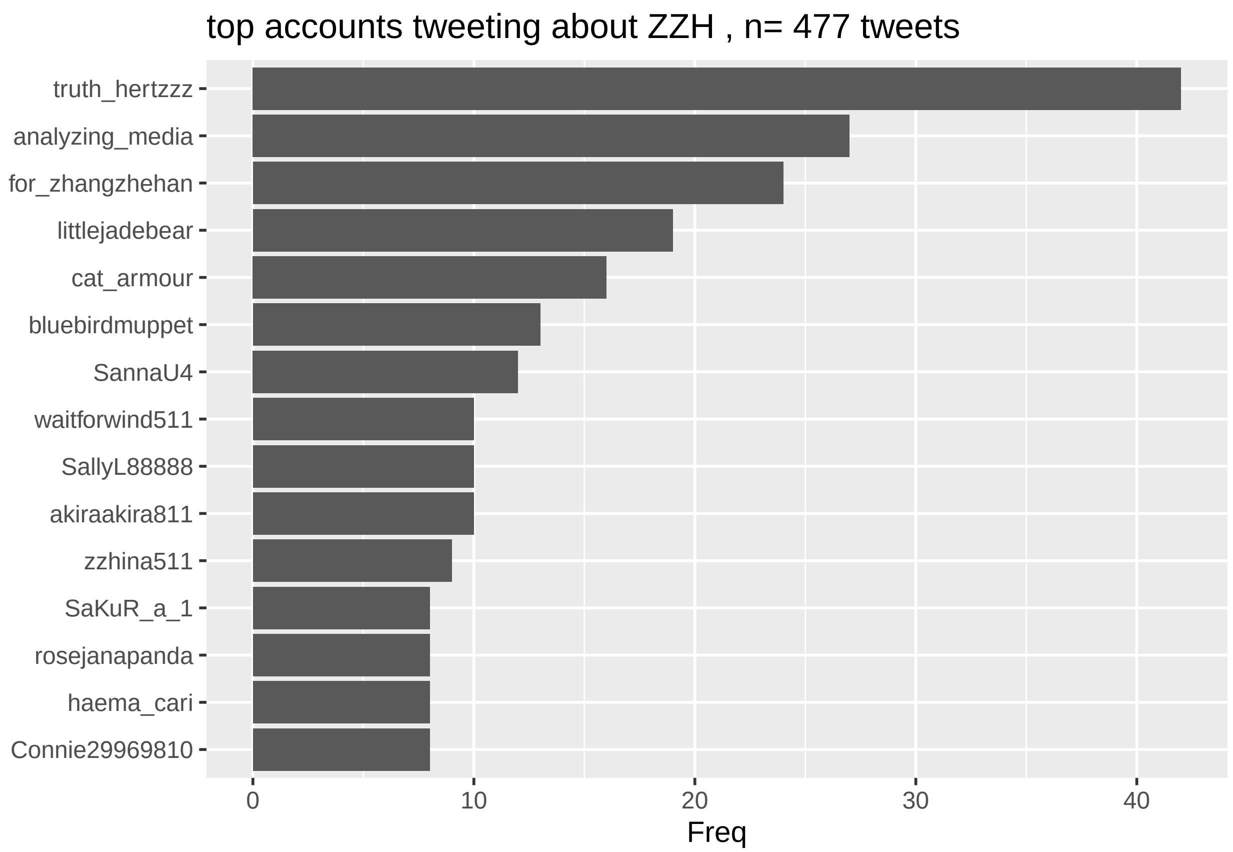
```
##
## [[2]]
```


top accounts tweeting about ZZH:JunZhe:GJ , n= 214 tweets
MiniOrchid1
TrulyTelesis
animeota
dillylene
mk_chronos
Blueclue511
4_SeasonManor
woaiwangxian
miapiapia
KexingsPoison
beniisora
Karenkk_axel
East_Of_Hell
CallofTheWind22
Rei_remediating
jujoop09
0
5
10
15
20
Freq

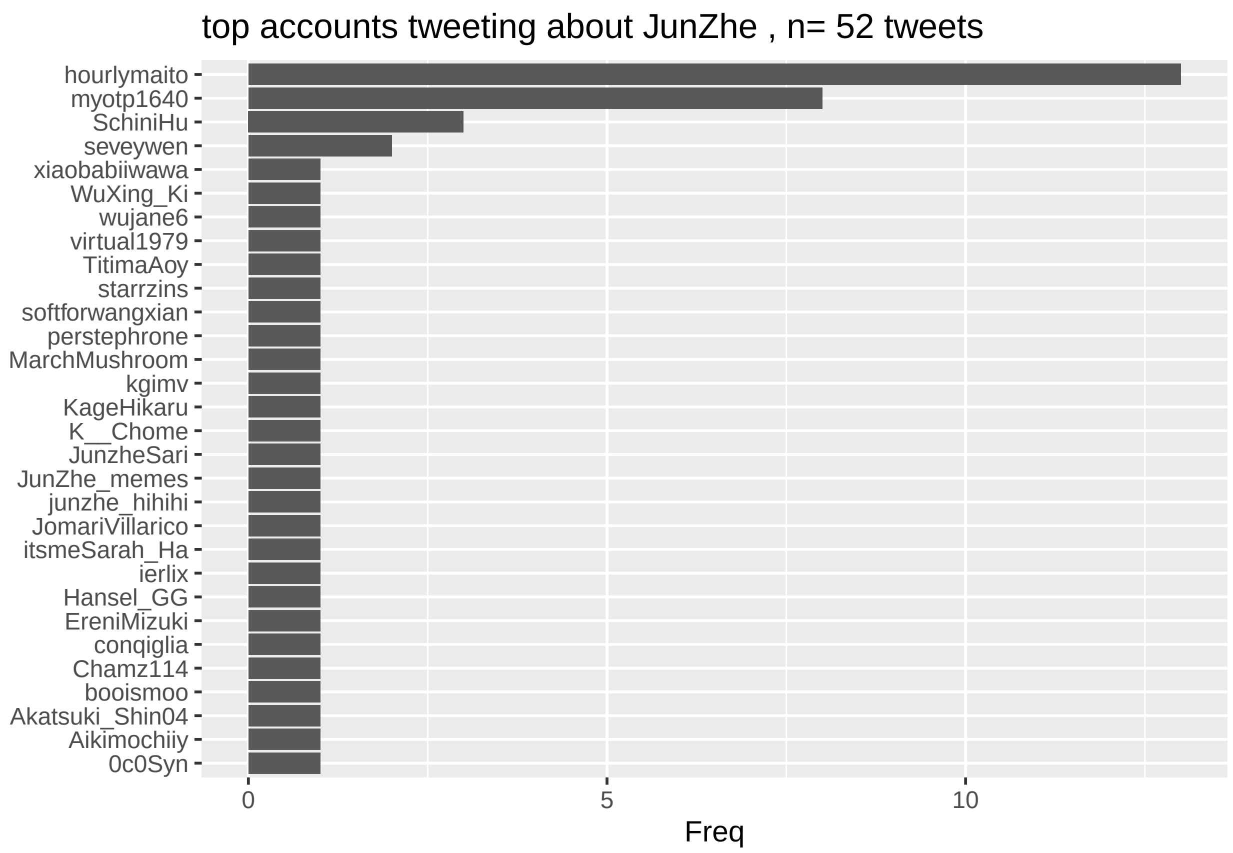
```
##
## [[3]]
```


top accounts tweeting about GJ , n= 693 tweets
withJUN_11
dailydoseGJ
gongjunweixian
GongJun1314
starbbrights
GongJunGlobal
gongjun_
gongjunguard
JunWXian
OhMyGongJun
ExcitingExiste1
ABNmango
nideta520
humaisand
iread_itext
0
25
50
75
Freq

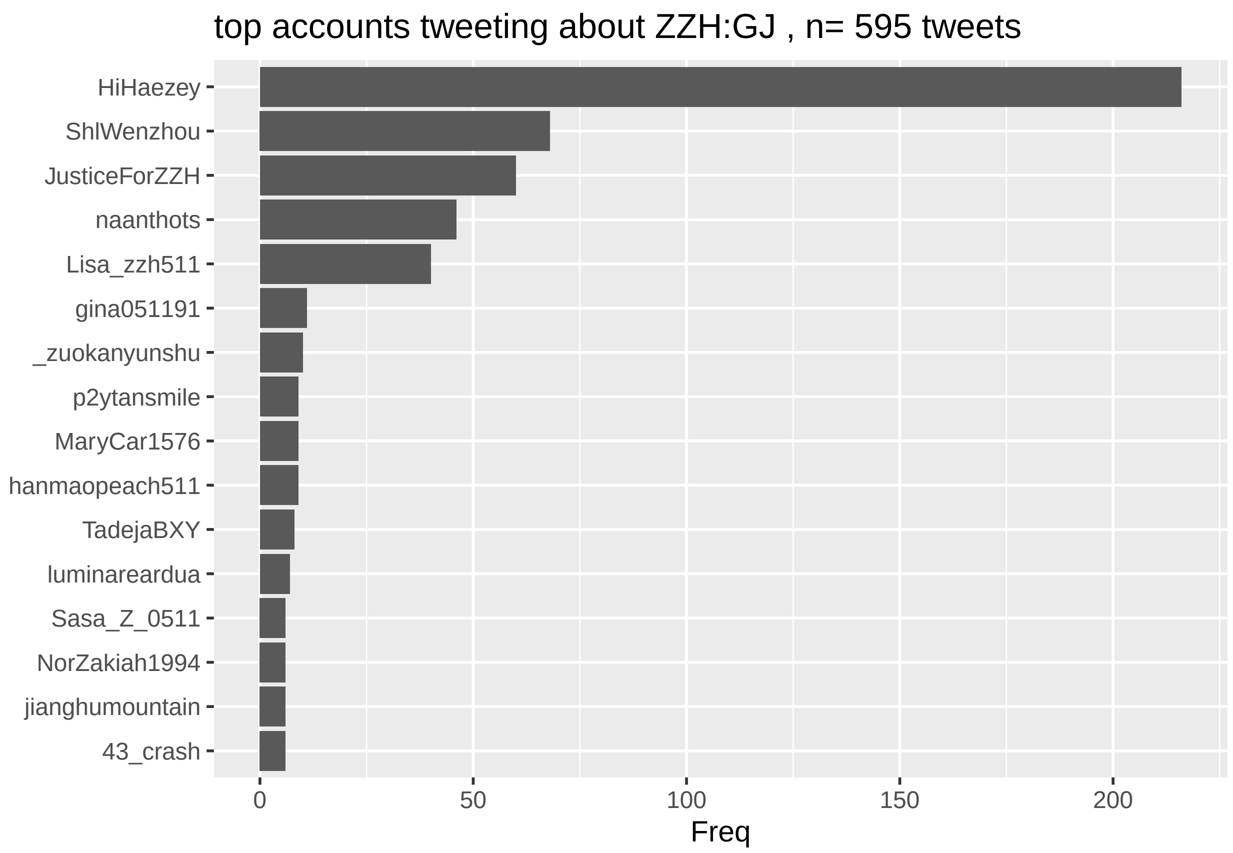
```
##
## [[4]]
```


top accounts tweeting about ZZH , n= 477 tweets
truth_hertzzz
analyzing_media
for_zhangzhehan
littlejadebear
cat_armour
bluebirdmuppet
SannaU4
waitforwind511
SallyL88888
akiraakira811
zzhina511
SaKuR_a_1
rosejanapanda
haema_cari
Connie29969810
0
10
20
30
40
Freq

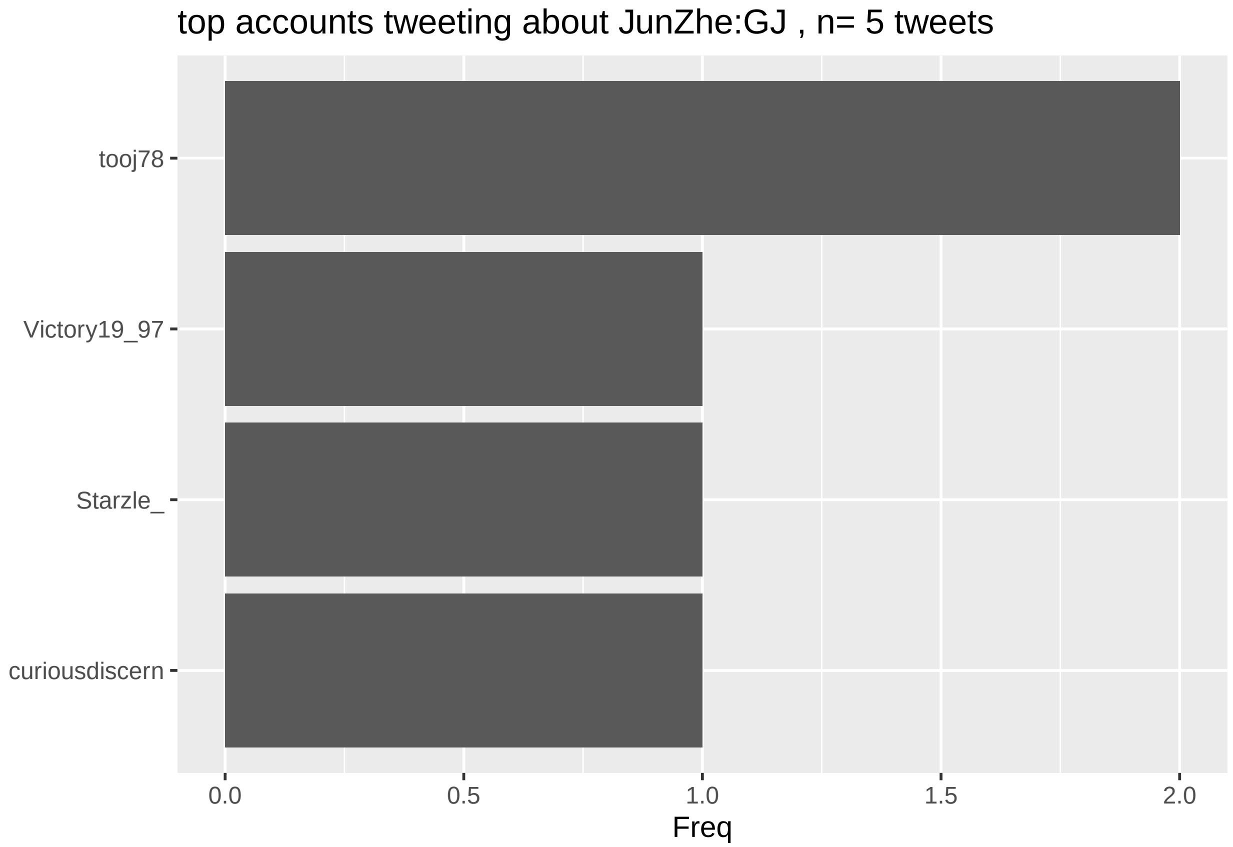
```
##
## [[5]]
```


top accounts tweeting about JunZhe , n= 52 tweets
hourlymaito
myotp1640
SchiniHu
seveywen
xiaobabiiwawa
WuXing_Ki
wujane6
virtual1979
TitimaAoy
starrzins
softforwangxian
perstephrone
MarchMushroom
kgimv
KageHikaru
K__Chome
JunzheSari
JunZhe_memes
junzhe_hihihi
JomariVillarico
itsmeSarah_Ha
ierlix
Hansel_GG
EreniMizuki
conqiglia
Chamz114
booismoo
Akatsuki_Shin04
Aikimochiiy
0c0Syn
0
5
10
Freq

```
##
## [[6]]
```


top accounts tweeting about ZZH:GJ , n= 595 tweets
HiHaezey
ShlWenzhou
JusticeForZZH
naanthots
Lisa_zzh511
gina051191
_zuokanyunshu
p2ytansmile
MaryCar1576
hanmaopeach511
TadejaBXY
luminareardua
Sasa_Z_0511
NorZakiah1994
jianghumountain
43_crash
0
50
100
150
200
Freq

```
##
## [[7]]
```


top accounts tweeting about JunZhe:GJ , n= 5 tweets
tooj78
Victory19_97
Starzle_
curiousdiscern
0.0
0.5
1.0
1.5
2.0
Freq