Twitter zzh-gj-jz association

26 May, 2022

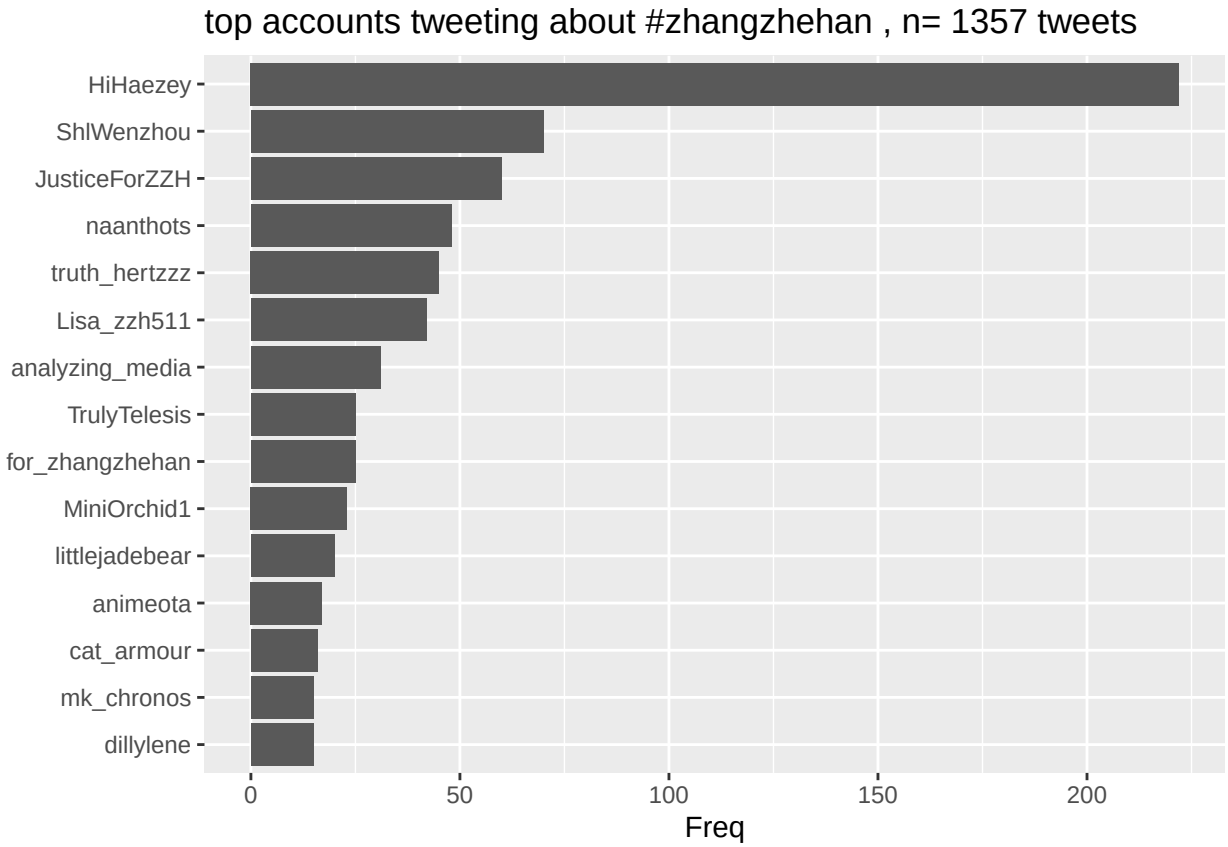
In this analysis I will first extract tweets mentioning "#zhangzhehan", "#gongjun" or "#junzhe" and then check the overlap between accounts tweeting about these topics. After playing around a bit I decided to use only hashtags instead of full names to focus on dedicated tweets instead of casual mentions.

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.

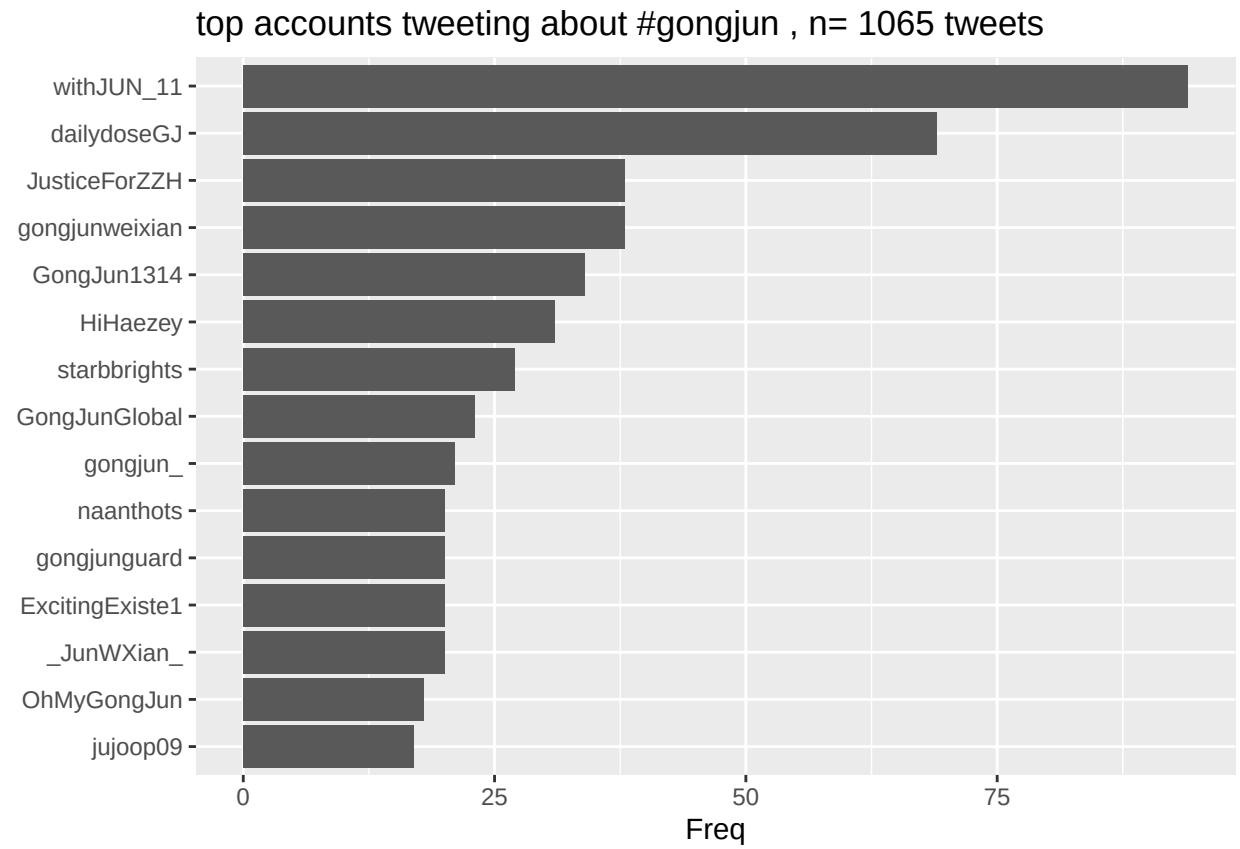
```
###extract tweets

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
```



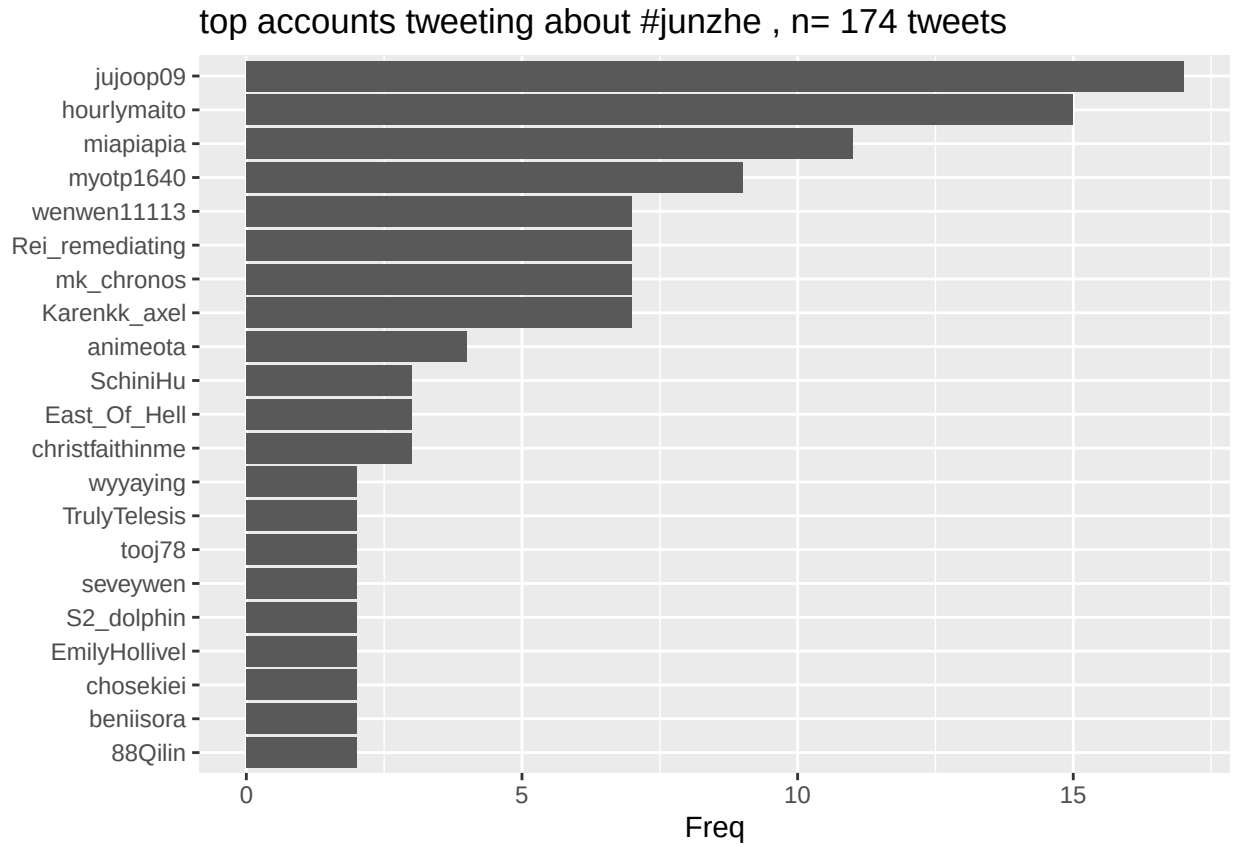

```
gj_tweets<-tweets_extract_plot(c("#gongjun"),"#gongjun")
```

```
## 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: 1357"
## [1] "start: 2022-05-17 23:46:18"
## [1] "end: 2022-05-26 06:17:10"
## Time difference of 8.271435 days
## [1] "tweets per day: 164.06"
```

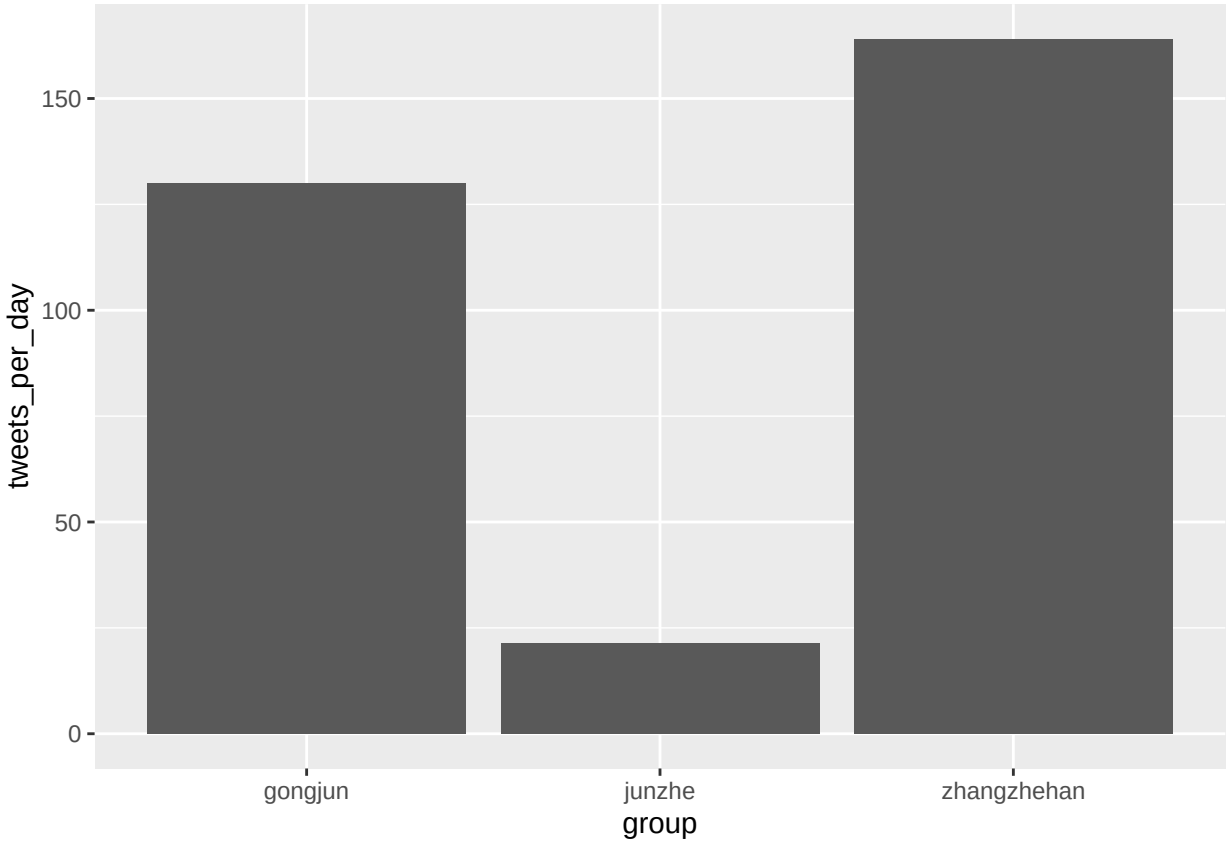
```
st_gj<-tweet_stats(gj_tweets,"#gongjun")
```

```
## [1] "dataset: #gongjun"
## [1] "number of tweets: 1065"
## [1] "start: 2022-05-18 01:39:45"
## [1] "end: 2022-05-26 06:17:23"
## Time difference of 8.192801 days
## [1] "tweets per day: 129.99"
```

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

```
## [1] "dataset: #junzhe"
## [1] "number of tweets: 174"
## [1] "start: 2022-05-18 01:32:49"
## [1] "end: 2022-05-26 06:00:47"
## Time difference of 8.186088 days
## [1] "tweets per day: 21.26"
```

```
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.

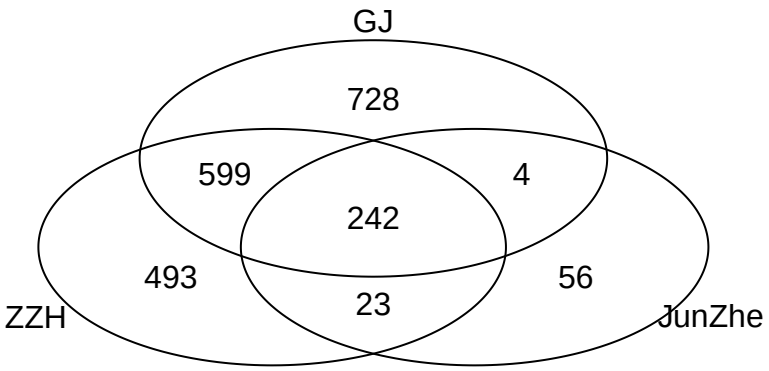
Note: This plot is not based on tweets containing the respective topics in combination. Instead it plots, e.g. how often accounts mentioning "ZZH" have also mentioned "Gong Jun", this can be in the same or different tweets.

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

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

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

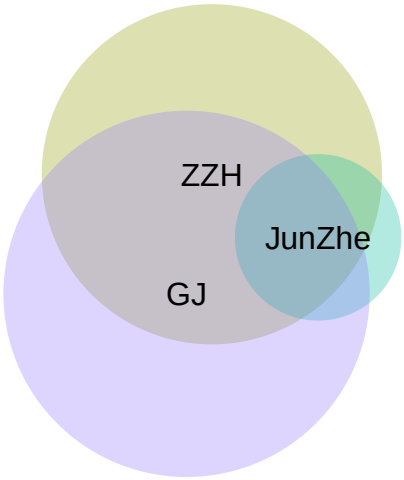
```
x <- list("ZZH" = zzh_tweets$screen_name,
          "JunZhe" = jz_tweets$screen_name,
          "GJ" = gj_tweets$screen_name)
v.table <- venn(x)
```



```
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 accounts with the most tweets not mentioning the other 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
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## Selecting by Freq

## [[1]]
```
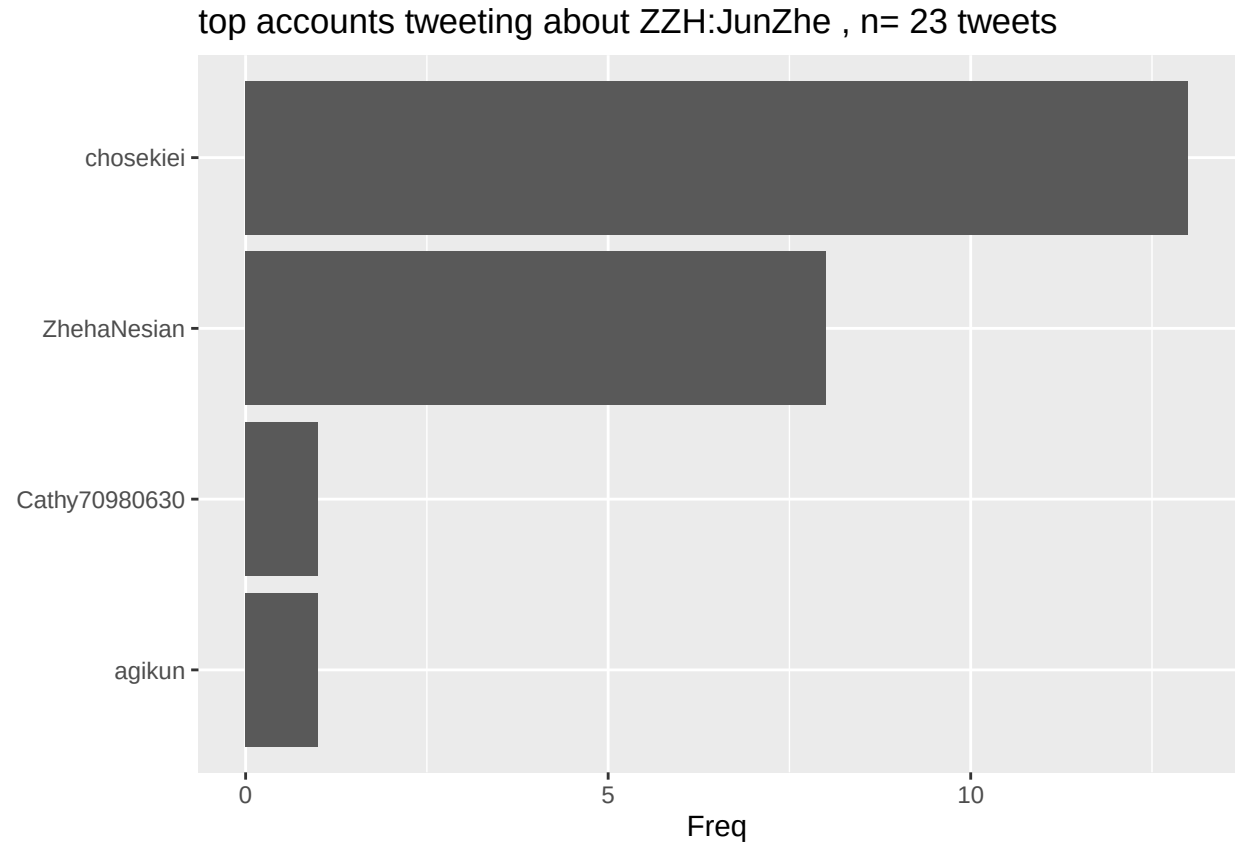
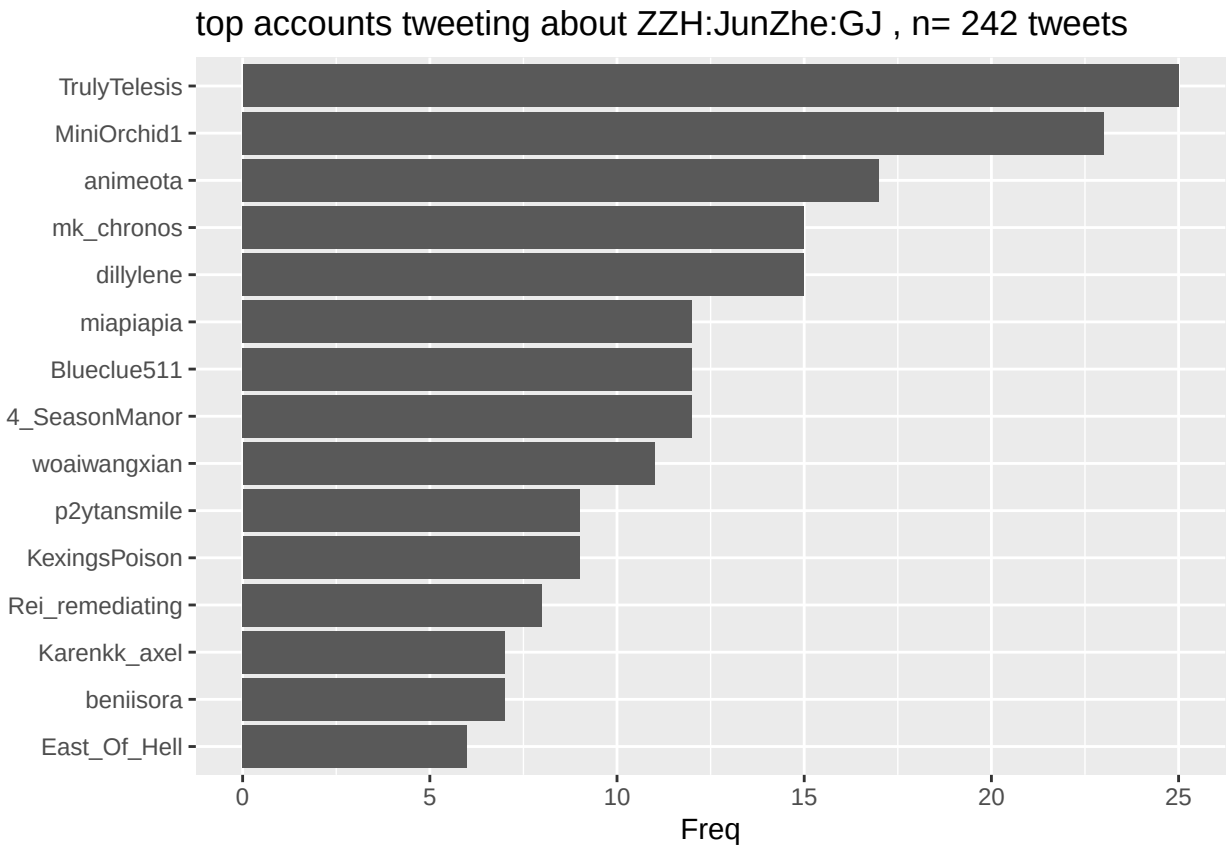
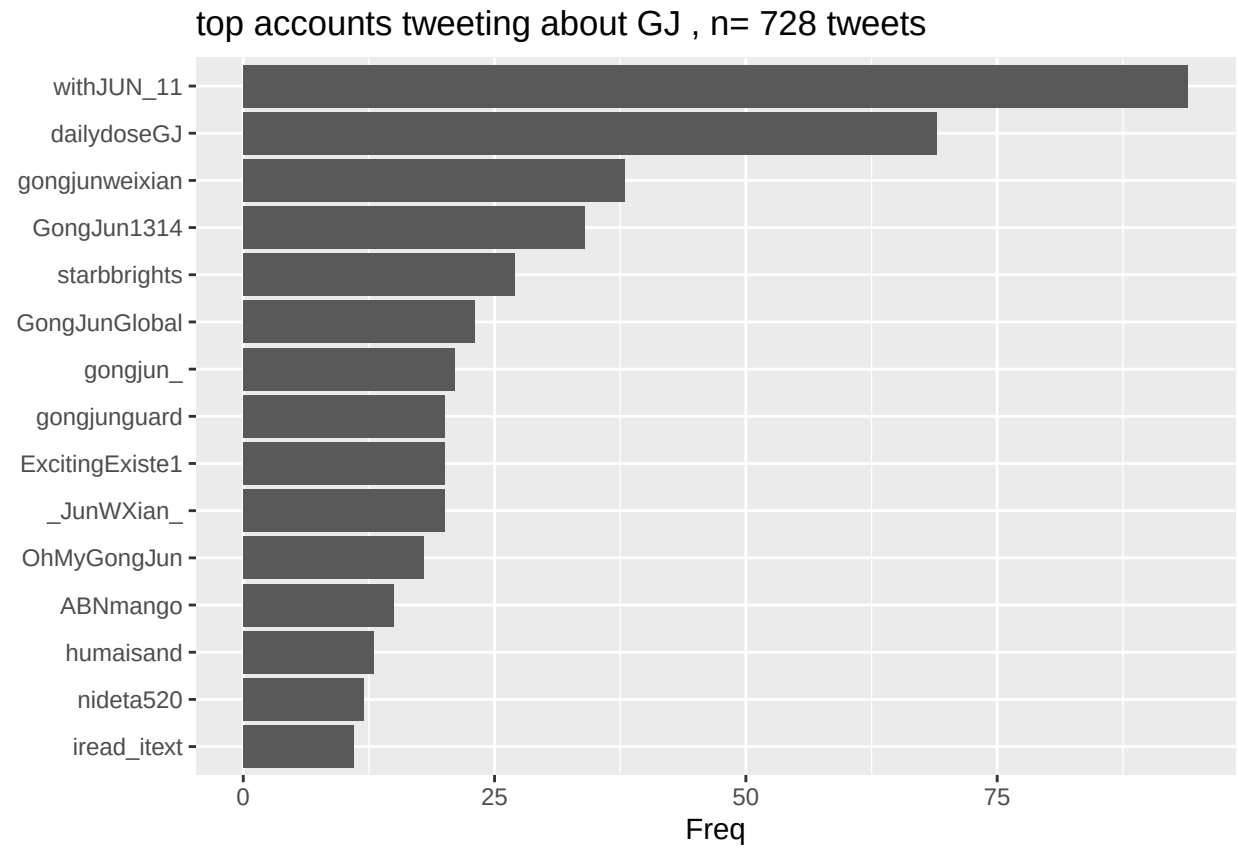




```
##
```

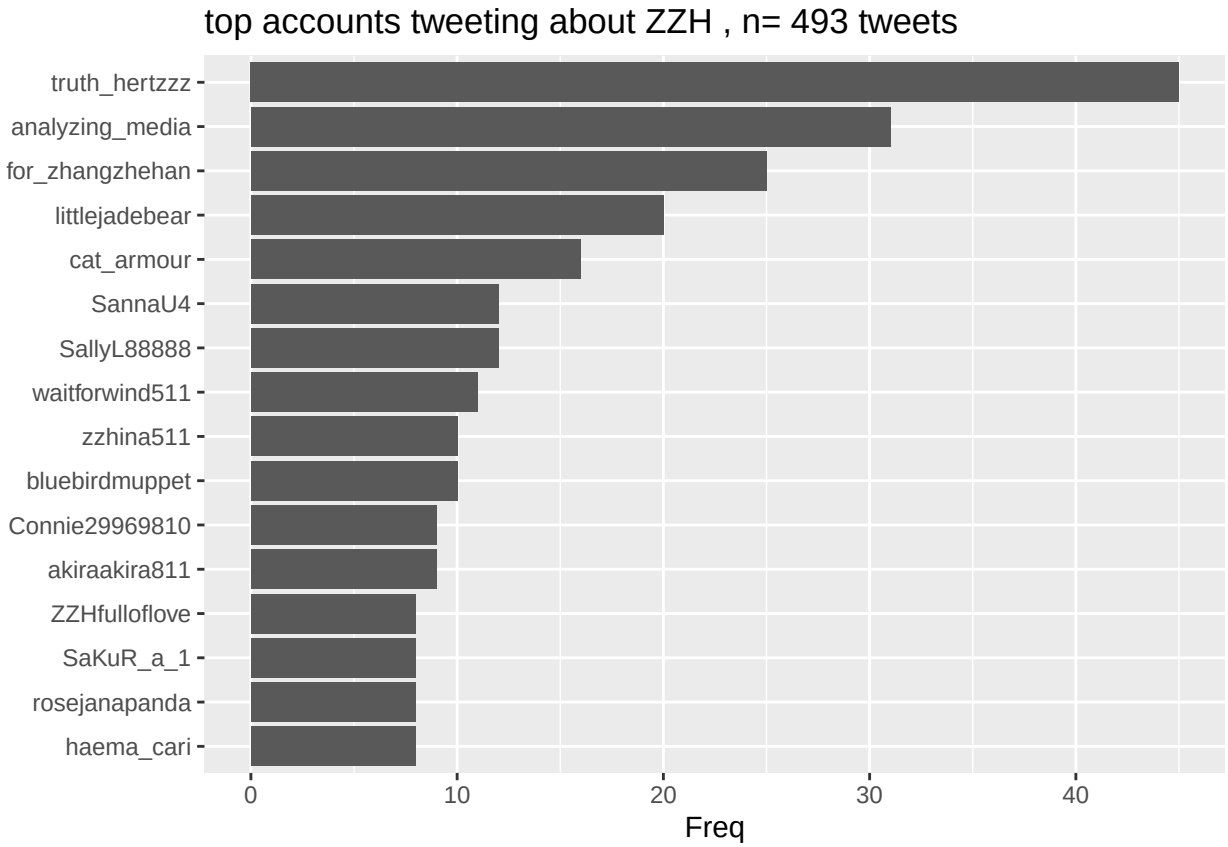
```
## [[2]]
```


top accounts tweeting about ZZH:JunZhe:GJ , n= 242 tweets
TrulyTelesis
MiniOrchid1
animeota
mk_chronos
dillylene
miapiapia
Blueclue511
4_SeasonManor
woaiwangxian
p2ytansmile
KexingsPoison
Rei_remediating
Karenkk_axel
beniisora
East_Of_Hell
0
5
10
15
20
25
Freq

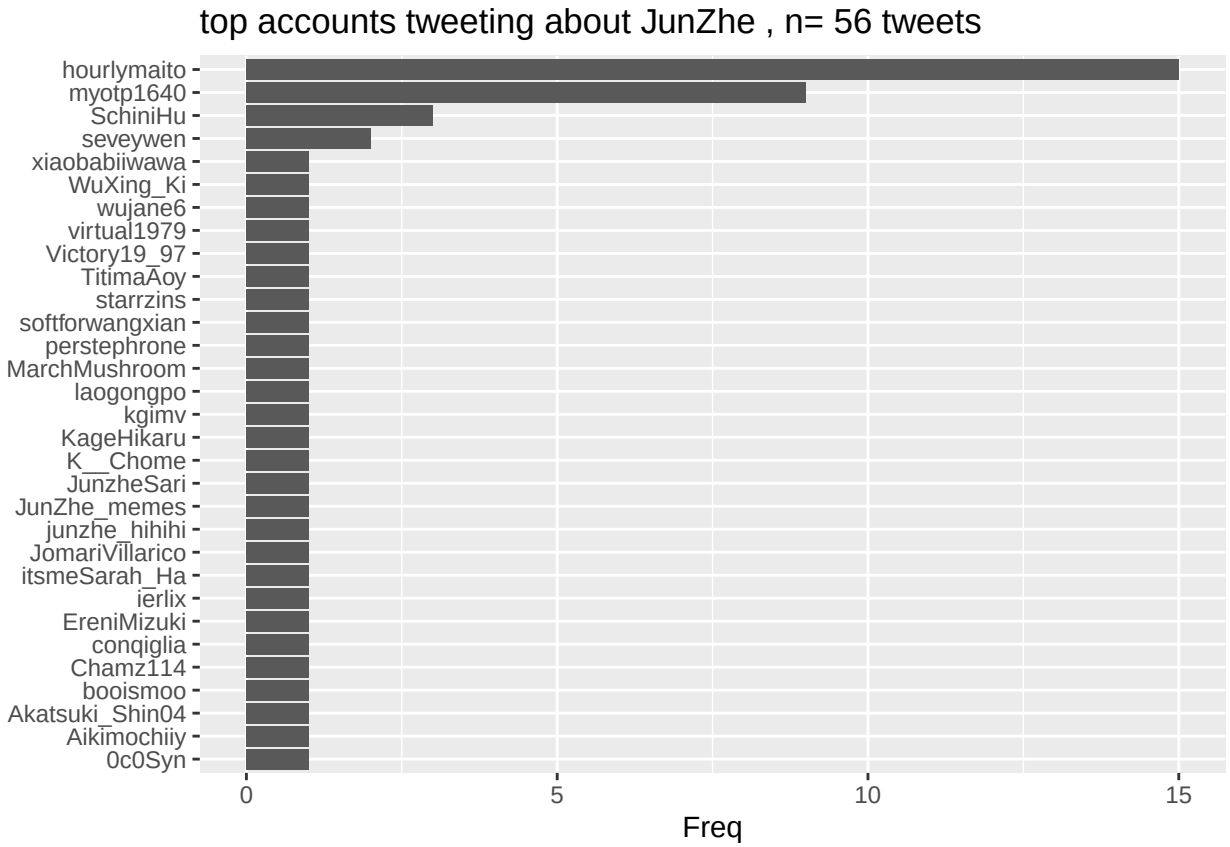
```
##
## [[3]]
```


top accounts tweeting about GJ , n= 728 tweets
withJUN_11
dailydoseGJ
gongjunweixian
GongJun1314
starbbrights
GongJunGlobal
gongjun_
gongjunguard
ExcitingExiste1
JunWXian
OhMyGongJun
ABNmango
humaisand
nideta520
iread_itext
0
25
50
75
Freq

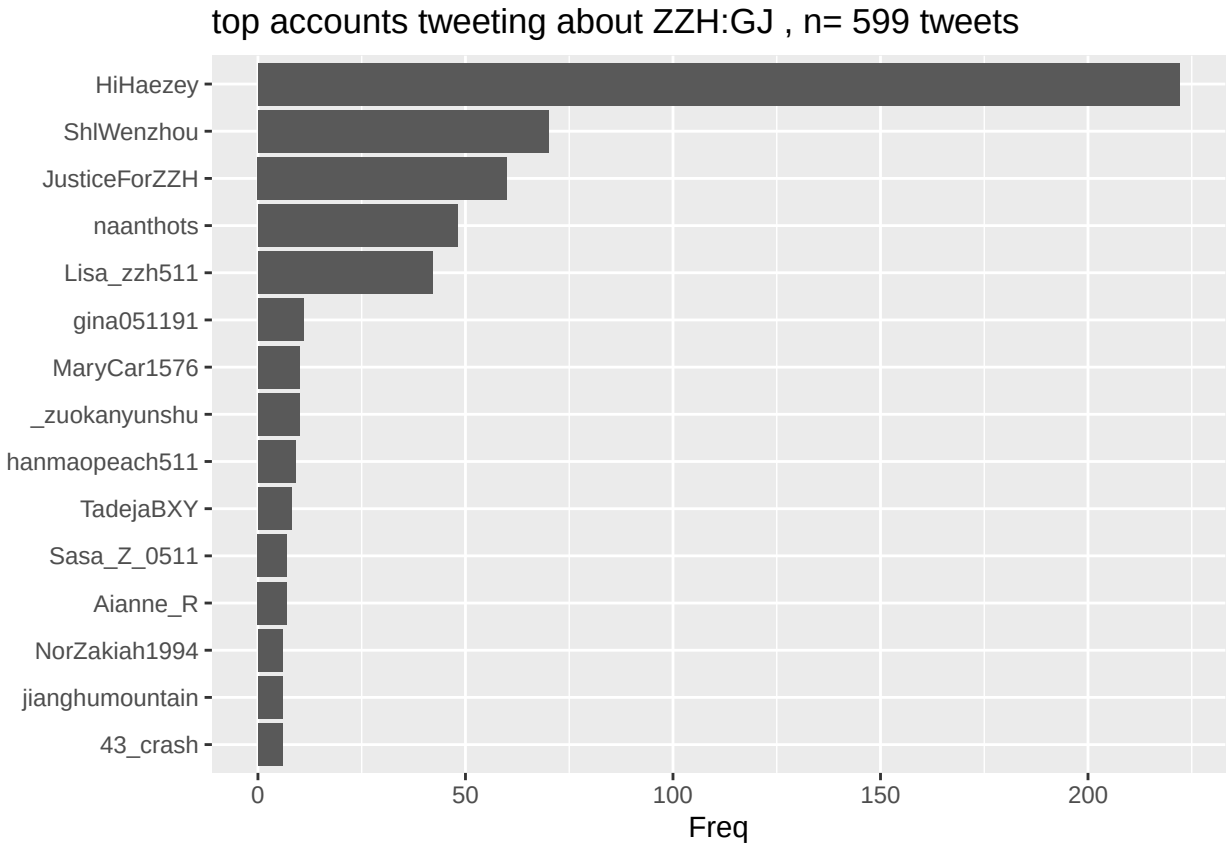
```
##
## [[4]]
```


top accounts tweeting about ZZH , n= 493 tweets
truth_hertzzz
analyzing_media
for_zhangzhehan
littlejadebear
cat_armour
SannaU4
SallyL88888
waitforwind511
zzhina511
bluebirdmuppet
Connie29969810
akiraakira811
ZZHfulloflove
SaKuR_a_1
rosejanapanda
haema_cari
0
10
20
30
40
Freq

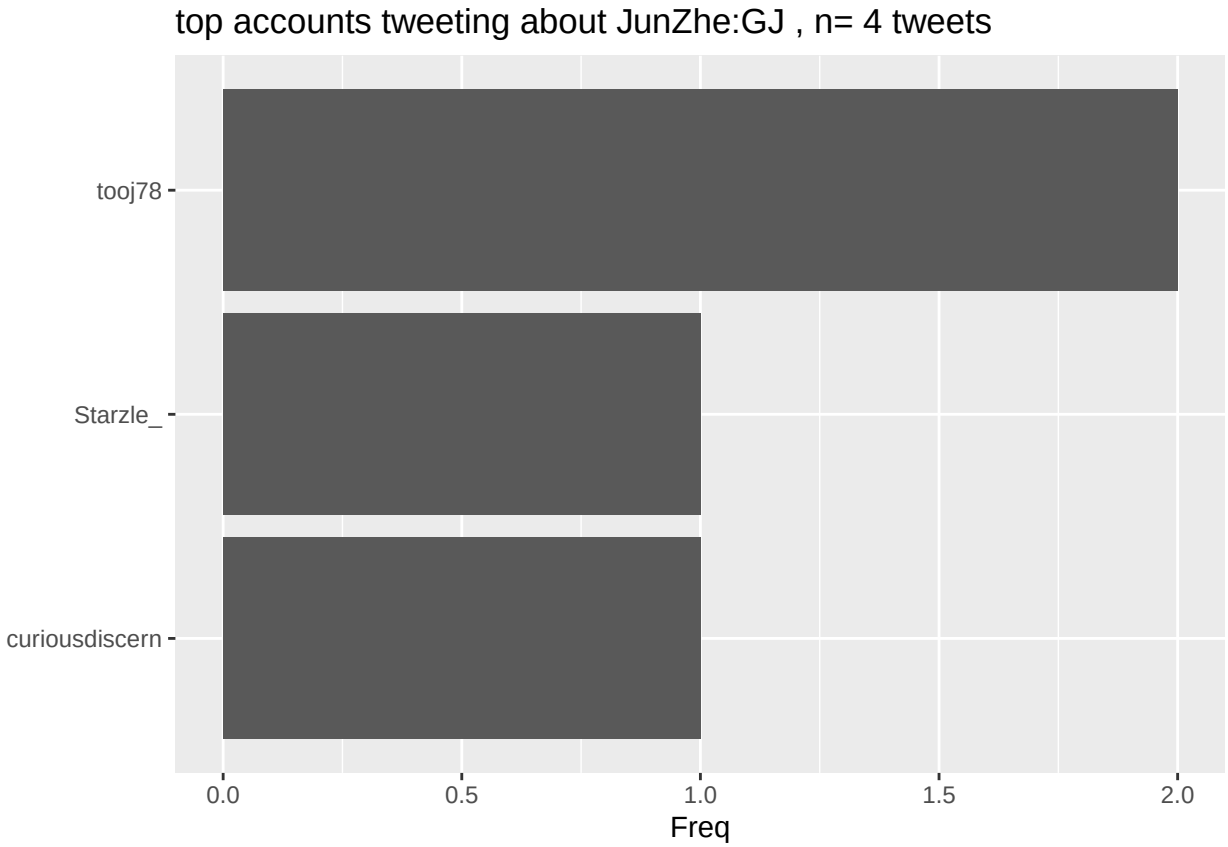
```
##
## [[5]]
```


top accounts tweeting about JunZhe , n= 56 tweets
hourlymaito
myotp1640
SchiniHu
seveywen
xiaobabiiwawa
WuXing_Ki
wujane6
virtual1979
Victory19_97
TitimaĀoy
starrzins
softforwangxian
perstephrone
MarchMushroom
laogongpo
kgimv
KageHikaru
K__Chome
JunzheSari
JunZhe_memes
junzhe_hihihi
JomariVillarico
itsmeSarah_Ha
ierlix
EreniMizuki
conqiglia
Chamz114
booismoo
Akatsuki_Shin04
Aikimochiiy
0c0Syn
0
5
10
15
Freq

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


top accounts tweeting about ZZH:GJ , n= 599 tweets
HiHaezey
ShlWenzhou
JusticeForZZH
naanthots
Lisa_zzh511
gina051191
MaryCar1576
_zuokanyunshu
hanmaopeach511
TadejaBXY
Sasa_Z_0511
Aianne_R
NorZakiah1994
jianghumountain
43_crash
0
50
100
150
200
Freq

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


top accounts tweeting about JunZhe:GJ , n= 4 tweets
tooj78
Starzle_
curiousdiscern
0.0
0.5
1.0
1.5
2.0
Freq