# Preliminar analysis and recoding

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## Contents



### 1) First import the dataset and check variables

```
# import the data
tw <-  read_csv("data/large_files/politicians_all_final_tweets.csv", show_col_types = FALSE )

kable(colnames(tw), col.names = "variables")
```

| variables |
|---|
| tw_screen_name |
| nome |
| tweet_testo |
| creato_il |
| creato_il_code |
| url |
| party_id |
| genere |
| chamber |
| status |

## 2) Adjust date.time format

```r
Sys.setlocale("LC_TIME", "C")
tw$date <- as.Date(strptime(tw$creato_il,"%a %b %d %H:%M:%S %z %Y", tz = "CET"))
tw$date <- na.replace(tw$date, as.Date(tw$creato_il))
```

### Check the conversion

```r
check_dates <- tw %>% select(creato_il,date)
kable(head(check_dates), col.names = c("Old date", "New date"))
```

| Old date | New date |
|---|---|
| 2021-02-13 | 2021-02-13 |
| 2021-02-09 | 2021-02-09 |
| 2021-02-07 | 2021-02-07 |
| 2021-01-21 | 2021-01-21 |
| 2021-01-21 | 2021-01-21 |
| 2021-01-20 | 2021-01-20 |

```r
kable(tail(check_dates), col.names = c("Old date", "New date"))
```

| Old date | New date |
|---|---|
| Mon Dec 28 09:51:35 +0000 2020 | 2020-12-28 |
| Tue Jul 20 11:15:44 +0000 2021 | 2021-07-20 |
| Thu Nov 26 13:46:51 +0000 2020 | 2020-11-26 |
| Fri Oct 15 17:28:57 +0000 2021 | 2021-10-15 |
| Wed Jun 03 12:22:31 +0000 2020 | 2020-06-03 |
| Fri Dec 03 21:01:20 +0000 2021 | 2021-12-03 |

## 3) Create the week variable

```r
tw <- tw %>% mutate(week = cut.Date(date, breaks = "1 week", labels = FALSE))
```

```r
max(tw$date)
```

### Inspect the first and the last dates and check if the number of weeks is correct

```
## [1] "2022-04-18"
```

```r
min(tw$date)
```

```
## [1] "2020-01-01"
```

```
difftime(max(tw$date), min(tw$date), units = "weeks")
```

```
## Time difference of 119.7143 weeks
```

### Create the month variable

```
tw <- tw %>% mutate(month = cut.Date(date, breaks = "1 month", labels = FALSE))
```

```
max(tw$month)
```

### Check the number of month

```
## [1] 28
```

```
length(seq(from = min(tw$date), to = max(tw$date), by = 'month'))
```

```
## [1] 28
```

### Count the number of missing values

```
sum(is.na(tw))
```

```
## [1] 153800
```

### Inspect where are those missings

```
missings <- c(
sum(is.na(tw$tw_screen_name)),
sum(is.na(tw$nome)),
sum(is.na(tw$tweet_testo)),
sum(is.na(tw$creato_il)),
sum(is.na(tw$creato_il_code)),
sum(is.na(tw$url)),
sum(is.na(tw$party_id)),
sum(is.na(tw$genere)),
sum(is.na(tw$chamber)),
sum(is.na(tw$status)),
sum(is.na(tw$date)),
sum(is.na(tw$week)),
sum(is.na(tw$month)) )

missing_df <- data.frame(colnames(tw), missings)
kable(missing_df)
```

| colnames.tw. | missings |
|---|---|
| tw_screen_name | 0 |
| nome | 0 |
| tweet_testo | 6494 |
| creato_il | 0 |
| creato_il_code | 0 |
| url | 147306 |
| party_id | 0 |
| genere | 0 |
| chamber | 0 |
| status | 0 |
| date | 0 |
| week | 0 |
| month | 0 |

**From that analysis i obtain 147306 url missing, this is because the url is collected only when the tweets has an external link to other sources, for our analysis we can ignore those missings, with this check also results 6494 tweets missing those are the cases when someone post only images or video without text, so the extraction is correct.**

## 4) Remove the rows with missing tweets

```
sum(is.na(tw$tweet_testo))
```

```
## [1] 6494
```

```
tw <- tw %>% drop_na(tweet_testo)
```

## 5) Inspect that the variables correspond to the expectation

```
unique(tw$party_id)
```

```
##  [1] "PD"           "FDI"          "M5S"          "FI"           "REG_LEAGUES"
##  [6] "MISTO"        "LEGA"         "IV"           "INDIPENDENTE" "CI"
## [11] "LEU"
```

```
unique(tw$genere)
```

```
## [1] "male"   "female" "male "
```

```
unique(tw$chamber)
```

```
## [1] "NotParl" "Senate"  "Camera"
```

```
unique(tw$status)
```

```
## [1] "sottosegretario" "presregione"     "viceministro"    "ministro"
## [5] "segretario"      "Parl"
```

**The variable genere needs to be corrected**

```
# Remove space from genere variable [RUN ONLY ONCE!]
a <- unique(tw$genere)
a[3]
```

```
## [1] "male "
```

```
which(tw$genere == a[3])
```

```
## [1] 32220 32221 32222 32223 32224
```

```
tw$genere <- gsub(a[3],"male",tw$genere)
```

**Check the substitution**

```
which(tw$genere == a[3])
```

```
## integer(0)
```

```
unique(tw$genere)
```

```
## [1] "male"   "female"
```

**Now all the variables are ready for next steps**

## 6) Create a new dataset with only necessary informations

```
# Select variables for the analysis
dataset <- tw %>% select(nome, tweet_testo, genere, party_id,chamber,status, date, week, month )
colnames(dataset)
```

```
## [1] "nome"        "tweet_testo" "genere"      "party_id"    "chamber"
## [6] "status"      "date"        "week"        "month"
```

## 7) Create the corpus

```r
corpus <- corpus(dataset, text = "tweet_testo")
ndoc(corpus)
```

```
## [1] 390117
```

### 8) Create the DFM

```r
# Split the corpus into single tokens (remain positional)
doc.tokens <- tokens(corpus,
                                 remove_punct = TRUE,
                                 remove_numbers = TRUE,
                                 remove_symbols = TRUE,
                                 remove_url = TRUE)

# Import my stopwords
my_word <- as.list(read_csv("data/it_stopwords_new_list.csv",
                              show_col_types = FALSE))

# Attach unrecognized symbols
my_list <- c(" ","c'è","+"," ", my_word$stopwords, stopwords('italian'))

doc.tokens <- tokens_select(doc.tokens, my_list, selection='remove')

DFM <- dfm(doc.tokens)

# Check the topfeatures
topfeatures(DFM,15)
```

```
##    governo     grazie     lavoro      paese       anni presidente     grande
##      25991      20760      18274      16444      16281      14215      13606
##   italiani     italia   l'italia        via   politica  cittadini       bene
##      11993      11955      11728      11495       9930       9331       9269
##      forza
##       8474
```

### 9) Trim the data

**Only words that occur in the top 20% of the distribution and in less than 30% of documents. Very frequent but document specific words.**

```r
DFM_trimmed <- dfm_trim(DFM, min_termfreq = 0.80, termfreq_type = "quantile",
                        max_docfreq = 0.3, docfreq_type = "prop")
```

**Now the data are ready for the next analysis**

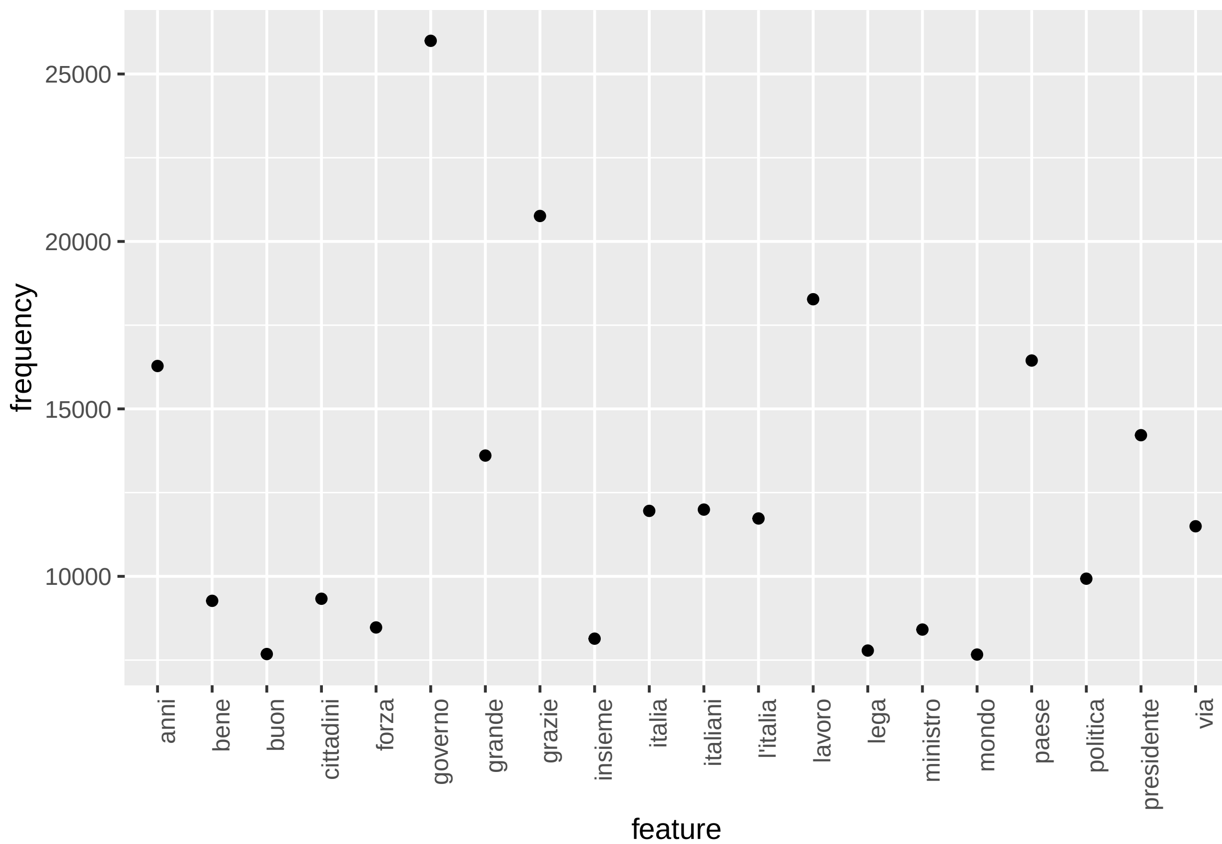
## 10) Some preliminar analysis

### Topfeatures frquency

```r
# Plot frequency of the topfeatures in the original DFM
features_dfm <- textstat_frequency(DFM, n = 20)
features_dfm
```

```
##       feature frequency rank docfreq group
## 1     governo     25991    1   24667   all
## 2      grazie     20760    2   19775   all
## 3      lavoro     18274    3   17107   all
## 4       paese     16444    4   16083   all
## 5        anni     16281    5   15420   all
## 6  presidente     14215    6   13444   all
## 7      grande     13606    7   12777   all
## 8    italiani     11993    8   11653   all
## 9      italia     11955    9   11570   all
## 10   l'italia     11728   10   11354   all
## 11        via     11495   11   11249   all
## 12   politica      9930   12    9500   all
## 13  cittadini      9331   13    9149   all
## 14       bene      9269   14    9000   all
## 15      forza      8474   15    8121   all
## 16   ministro      8411   16    8105   all
## 17    insieme      8139   17    7948   all
## 18       lega      7784   18    7391   all
## 19       buon      7680   19    7517   all
## 20      mondo      7664   20    7443   all
```

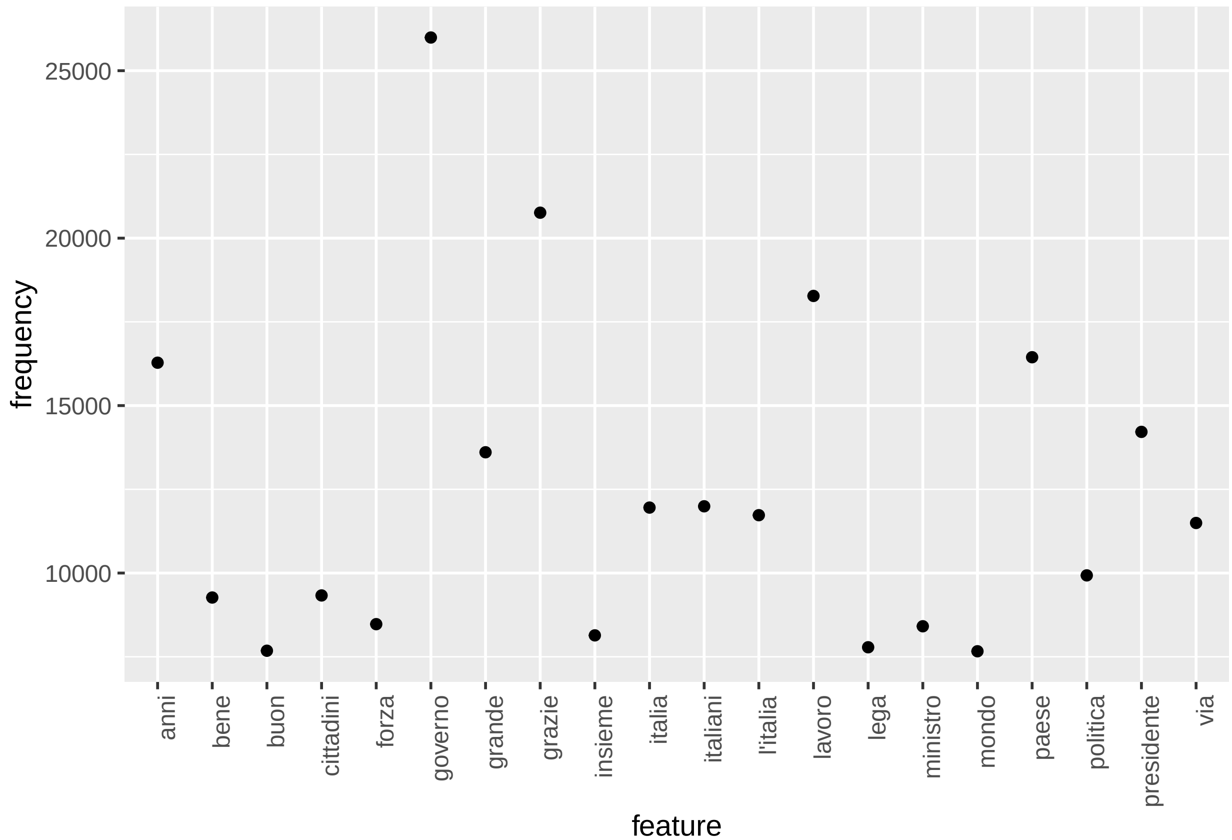
```r
ggplot(features_dfm, aes(x = feature, y = frequency)) +
  geom_point() +
  theme(axis.text.x = element_text(angle = 90, hjust = 1))
```




```
# Plot frequency of the topfeatures in the trimmed DFM
features_dfm_trimmed <- textstat_frequency(DFM_trimmed, n=20)
features_dfm_trimmed
```

```
##        feature frequency rank docfreq group
## 1      governo     25991    1   24667   all
## 2       grazie     20760    2   19775   all
## 3       lavoro     18274    3   17107   all
## 4        paese     16444    4   16083   all
## 5         anni     16281    5   15420   all
## 6   presidente     14215    6   13444   all
## 7       grande     13606    7   12777   all
## 8     italiani     11993    8   11653   all
## 9       italia     11955    9   11570   all
## 10    l'italia     11728   10   11354   all
## 11         via     11495   11   11249   all
## 12    politica      9930   12    9500   all
## 13   cittadini      9331   13    9149   all
## 14        bene      9269   14    9000   all
## 15       forza      8474   15    8121   all
## 16    ministro      8411   16    8105   all
## 17     insieme      8139   17    7948   all
## 18        lega      7784   18    7391   all
## 19        buon      7680   19    7517   all
## 20       mondo      7664   20    7443   all
```

```
ggplot(features_dfm_trimmed, aes(x = feature, y = frequency)) +
  geom_point() +
  theme(axis.text.x = element_text(angle = 90, hjust = 1))
```




**Most common hashtag**

```
tag_dfm <- dfm_select(DFM, pattern = "#*")
toptag <- names(topfeatures(tag_dfm, 20))
head(toptag)
```

```
## [1] "#coronavirus" "#covid19"     "#lega"        "#governo"     "#salvini"
## [6] "#conte"
```

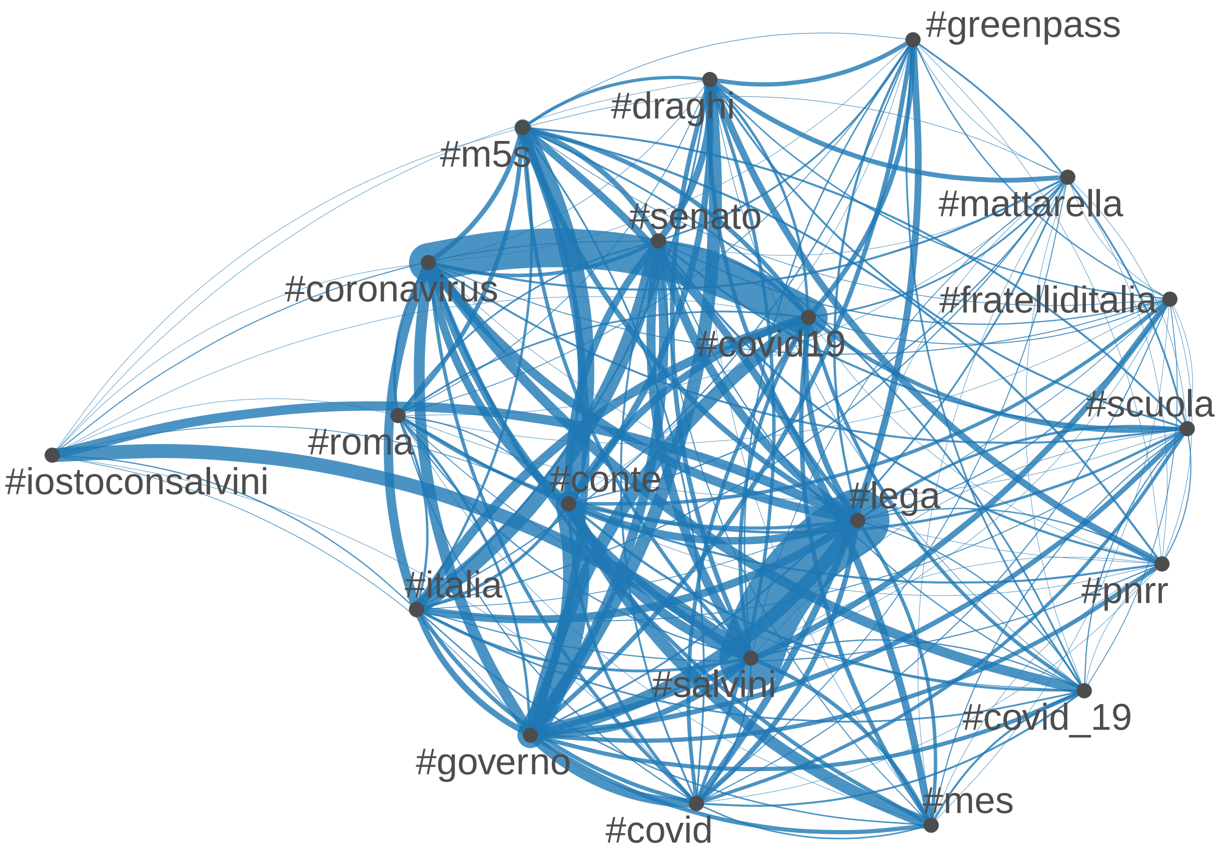
**Co-occurrence matrix of hashtag**

```
tag_fcm <- fcm(tag_dfm)
head(tag_fcm)
```

```
## Feature co-occurrence matrix of: 6 by 42,017 features.
##                        features
```

```
## features               #francomarini #paese #chiesa #lindapasqualetto #vicenza
##   #francomarini                    0      1       1                0        0
##   #paese                           0      2       1                0        0
##   #chiesa                          0      0       0                0        0
##   #lindapasqualetto                0      0       0                0        1
##   #vicenza                         0      0       0                0        0
##   #ilgiornaledivicenza             0      0       0                0        0
##                         features
## features               #ilgiornaledivicenza #veratvgroup #polis #usa
##   #francomarini                           0            0      0    0
##   #paese                                  0            0      0    0
##   #chiesa                                 0            0      0    0
##   #lindapasqualetto                       0            0      0    0
##   #vicenza                                0            0      0    1
##   #ilgiornaledivicenza                    0            0      0    0
##                         features
## features               #democrazia
##   #francomarini                  1
##   #paese                         2
##   #chiesa                        0
##   #lindapasqualetto              0
##   #vicenza                       0
##   #ilgiornaledivicenza           0
## [ reached max_nfeat ... 42,007 more features ]
```

```
topgat_fcm <- fcm_select(tag_fcm, pattern = toptag)
textplot_network(topgat_fcm, min_freq = 0.1, edge_alpha = 0.8, edge_size = 5)
```




**Extract most frequently mentioned usernames**

```
user_dfm <- dfm_select(DFM, pattern = "@*")
topuser <- names(topfeatures(user_dfm, 20))
head(topuser)
```

```
## [1] "@matteosalvinimi" "@fratelliditalia" "@forza_italia"    "@pdnetwork"
## [5] "@stampasgarbi"    "@mov5stelle"
```

**Feature-occurrence matrix of usernames**

```
user_fcm <- fcm(user_dfm)
head(user_fcm)
```

```
## Feature co-occurrence matrix of: 6 by 36,687 features.
##                     features
## features             @giornalevicenza @youtube @skytg24 @gianmarcotamber
##   @giornalevicenza                  0        0        0                0
##   @youtube                          0        0        4                0
##   @skytg24                          0        0        0                0
##   @gianmarcotamber                  0        0        0                0
```

```
##    @expo2020dubai                    0        0        0                0
##    @regionemarcheit                  0        0        0                0
##                     features
## features             @expo2020dubai @regionemarcheit @giorgiameloni
##    @giornalevicenza               0                0              0
##    @youtube                       0                0              1
##    @skytg24                       0                0              8
##    @gianmarcotamber               0                2              0
##    @expo2020dubai                 0                2              0
##    @regionemarcheit               0                0              1
##                     features
## features             @pres_casellati @robymancio @valeyellow46
##    @giornalevicenza                0           0             0
##    @youtube                        0           0             0
##    @skytg24                        0           0             0
##    @gianmarcotamber                2           2             2
##    @expo2020dubai                  0           0             0
##    @regionemarcheit                2           2             2
## [ reached max_nfeat ... 36,677 more features ]
```

```
user_fcm <- fcm_select(user_fcm, pattern = topuser)
textplot_network(user_fcm, min_freq = 0.1, edge_color = "orange", edge_alpha = 0.8, edge_size = 5)
```