Using tm package for a dendrogram and associations

Rodrigo Esteves de Lima-Lopes
State University of Campinas
rll307@unicamp.br

Contents

1 Introduction

Like we have already discussed, the package tm is a impressive tool for text processing. In this tutorial we are going to use it for calculating word clusters towards a corpus of tweets.

2 What will you need

2.1 Packages

For this tutorial we are going to need the following packages:

```
library(tm)
## Text processing
library(stats)
## Statistical analysis
library(rtweet)
## Twitter scraping
```

2.2 Customised functions

In this tutorial we will need a couple of customised functions:

```
removeURL <- function(x) gsub("http[[:alnum:][:punct:]]*", "", x)
remove.users <-function(x) gsub("@[[:alnum:][:punct:]]*","",x)
colLab <- function(n) {
  if (is.leaf(n)) {
    a <- attributes(n)
    labCol <- labelColors[clusMember[which(names(clusMember) == a$label)]]
    attr(n, "nodePar") <- c(a$nodePar, lab.col = labCol)
  }
  n
}
```

I will download Guilherme Boulos' Twitter timeline:

```
boulos <- get_timelines("GuilhermeBoulos", n = 3200)
```

3 Doing some analysis

First we will extract the text vector represented by Boulos' timeline and, then, creating the corpus

```
boulos.v <- boulos$text
corpus.cluster <- Corpus(VectorSource(boulos.v))
```

Now we are going to make a series of transformations, using `tm_map`, which applies changes into the corpus and a series of self-explaining functions:

```
corpus.cluster <- tm_map(corpus.cluster, content_transformer(tolower))
corpus.cluster <- tm_map(corpus.cluster, content_transformer(removeURL))
corpus.cluster <- tm_map(corpus.cluster,content_transformer(remove.users))
corpus.cluster <- tm_map(corpus.cluster, stripWhitespace)
corpus.cluster <- tm_map(corpus.cluster, removePunctuation)
corpus.cluster <- tm_map(corpus.cluster, function(x)removeWords(x,stopwords("pt")))
```

Now we are going to create a dtm for using in the calculations

```
cluster.tdm <- TermDocumentMatrix(corpus.cluster)
```

Now we are going to remove the sparse words and zero word tweets

```
cluster.m <- as.matrix(cluster.tdm)
cluster.wf <- rowSums(cluster.m)
cluster.m1 <- cluster.m[cluster.wf>quantile(cluster.wf,probs=0.99), ]
#removing 0 columns
cluster.m1<-cluster.m1[,colSums(cluster.m1)!=0]
```

Transforming the relationship in Binary

```
cluster.m1[cluster.m1 > 1] <- 1
cluster.m1dist <- dist(cluster.m1, method="binary")
```

Finally creating the cluster using Ward's method

```
clus1 <- hclust(cluster.m1dist, method="ward.D2")
```

Creating the cluster

```
plot(clus1, cex=0.9)
```

Now, improving it:

```
rect.hclust(clus1,k=10,border = "blue")
```

Let us make our cluster colourful

```
dend <- as.dendrogram(clus1)

labelColors <- c("#809acd", "#000000", "#EB6841", "#666666","#80cdb3",
                 "#c5ab8a","#ffa500","#0000ff", "#523415", "#b882ee")
clusMember <- cutree(clus1, 10)


clusDendro <- dendrapply(dend, colLab)
```

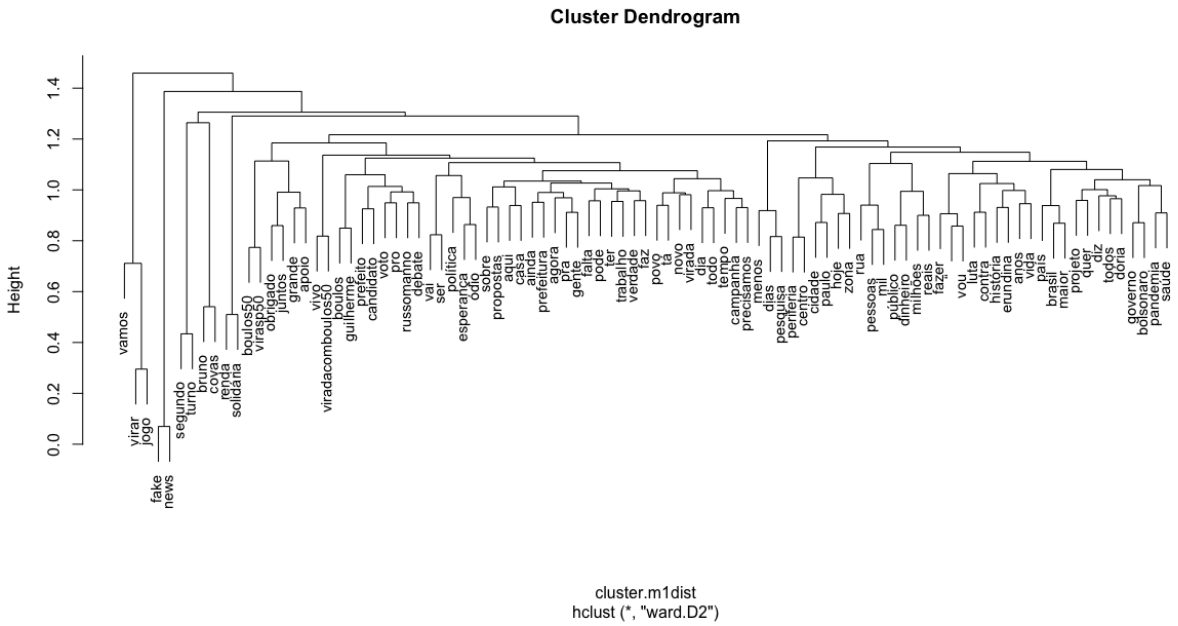


Figure 1: Cluster 1

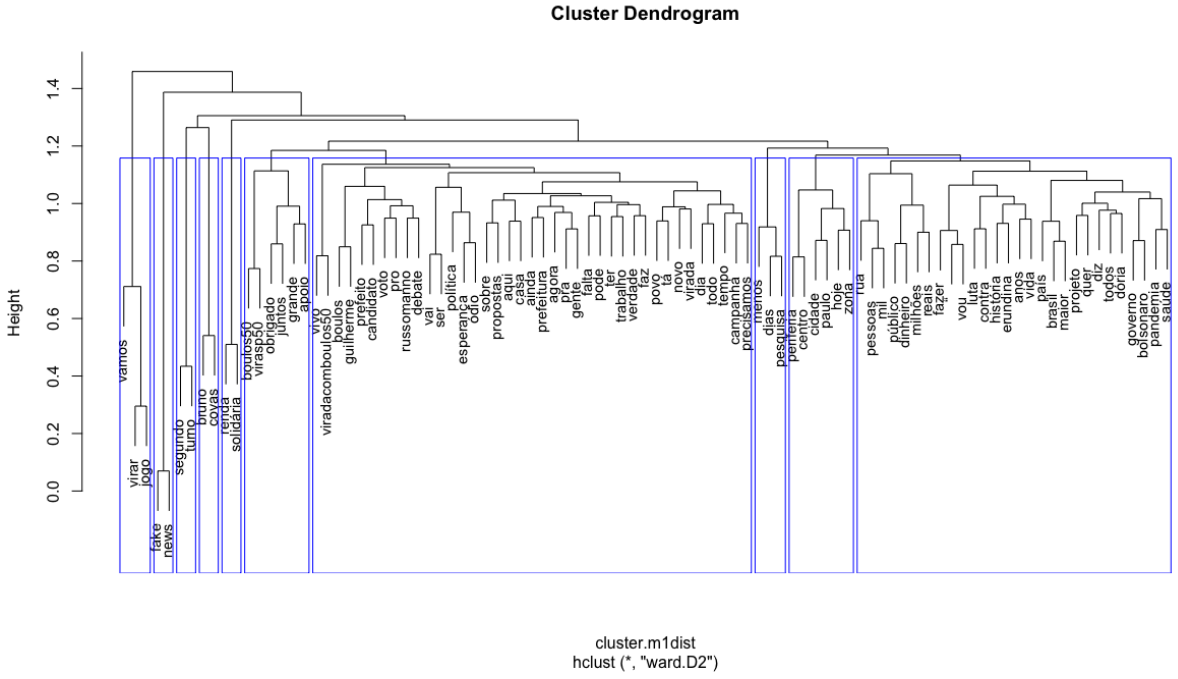
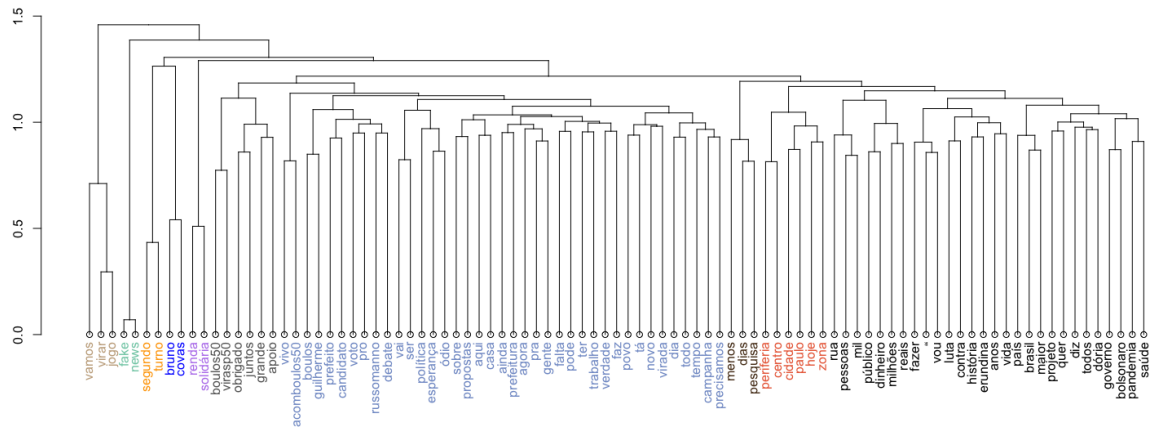


Figure 2: Cluster 2

```
plot(clusDendro,cex=1)
rect.hclust(clusDendro,k=2)
```

The result should be something like this:



Now let us find some associates:

```
findAssocs(cluster.tdm,"boulos",corlimit = .1)
```

```
> findAssocs(cluster.tdm,"boulos",corlimit = .1)
$boulos
    guilherme      erundina          1992          fesp      mantêlos
         0.35          0.22          0.15          0.14          0.14
     vínculo       receita      manchete           via        frança
         0.14          0.14          0.13          0.12          0.12
    faculdade        datena         ibope           amp   feminicídio
         0.12          0.12          0.11          0.11          0.11
     aparece       anuncia     inclusiva     questiona numericamente
         0.10          0.10          0.10          0.10          0.10
    indenizar      responde
         0.10          0.10
```

Figure 3: Associates

```
findAssocs(cluster.tdm,"fake",corlimit = .16)
```

```
> findAssocs(cluster.tdm,"fake",corlimit = .16)
$fake
         news surpreendente       criaram       jatinho
         0.96          0.23          0.21          0.21
      verdade  bolsonarista      gabinete   desmentindo
         0.20          0.19          0.18          0.18
```

Figure 4: Associates