Semi-supervised classification model: newsmap and keyATM

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```
rm(list=ls(all=TRUE))
getwd()
```

```
## [1] "C:/Users/Miras/Desktop/u Milan/1st year classes/Big Data
Analystics/Labs/Lab1"
```

```
setwd("C:/Users/Miras/Desktop/u_m/1st/big_data_analytics/Labs/projects")
getwd()
```

```
## [1] "C:/Users/Miras/Desktop/u Milan/1st year classes/Big Data
Analystics/Labs/Lab1"
```

```
library(manifestoR)
```

```
## Loading required package: NLP
```

```
## Loading required package: tm
```

```
## When publishing work using the Manifesto Corpus, please make sure to cite
it correctly and to give the identification number of the corpus version used
for your analysis.
##
## You can print citation and version information with the function
mp_cite().
##
## Note that some of the scaling/analysis algorithms provided with this
package were conceptually developed by authors referenced in the respective
function documentation. Please also reference them when using these
algorithms.
```

```
library(quanteda)
```

```
## Warning in .recacheSubclasses(def@className, def, env): undefined subclass
## "pcorMatrix" of class "replValueSp"; definition not updated
```

```
## Warning in .recacheSubclasses(def@className, def, env): undefined subclass
## "pcorMatrix" of class "xMatrix"; definition not updated
```

```
## Warning in .recacheSubclasses(def@className, def, env): undefined subclass
## "pcorMatrix" of class "mMatrix"; definition not updated
```

```
## Package version: 3.3.1
## Unicode version: 13.0
## ICU version: 69.1
```

```
## Parallel computing: 4 of 4 threads used.

## See https://quanteda.io for tutorials and examples.

##
## Attaching package: 'quanteda'

## The following object is masked from 'package:tm':
##
##     stopwords

## The following objects are masked from 'package:NLP':
##
##     meta, meta<-

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

# specify your key to get access to the CMP dataset via API
mp_setapikey(key.file = NULL, key = "8c56cf43c5629fdaac42e4ae791a317b")

library(newsmap)

## Warning in .recacheSubclasses(def@className, def, env): undefined subclass
## "pcorMatrix" of class "replValueSp"; definition not updated

## Warning in .recacheSubclasses(def@className, def, env): undefined subclass
## "pcorMatrix" of class "xMatrix"; definition not updated

## Warning in .recacheSubclasses(def@className, def, env): undefined subclass
## "pcorMatrix" of class "mMatrix"; definition not updated

library(quanteda)

uk <- mp_availability(countryname == "United Kingdom")

## Connecting to Manifesto Project DB API...
## Connecting to Manifesto Project DB API... corpus version: 2023-1
## Connecting to Manifesto Project DB API...
## Connecting to Manifesto Project DB API... corpus version: 2023-1
## Connecting to Manifesto Project DB API... corpus version: 2023-1

uk
```

```
##           Queried for        Corpus Version       Documents found
##                    98                2023-1          71 (72.449%)
## Coded Documents found       Originals found             Languages
##          34 (34.694%)          86 (87.755%)           1 (english)
```

```
uk<- as.data.frame(uk)
str(uk)
```

```
## 'data.frame':    98 obs. of  6 variables:
##  $ party      : num  51320 51420 51620 51320 51420 ...
##  $ date       : num  194507 194507 194507 195002 195002 ...
##  $ manifestos : logi  FALSE FALSE FALSE FALSE FALSE FALSE ...
##  $ originals  : logi  TRUE TRUE TRUE TRUE TRUE TRUE ...
##  $ annotations: logi  NA NA NA NA NA NA ...
##  $ language   : chr  NA NA NA NA ...
##  - attr(*, "query")= MnfstMtd [98 × 15] (S3:
ManifestoMetadata/tbl_df/tbl/data.frame)
##   ..$ party                      : num [1:98] 51320 51420 51620 51320
51420 ...
##   ..$ date                       : num [1:98] 194507 194507 194507 195002
195002 ...
##   ..$ language                   : chr [1:98] NA NA NA NA ...
##   ..$ source                     : chr [1:98] NA NA NA NA ...
##   ..$ has_eu_code                : logi [1:98] FALSE FALSE FALSE FALSE
FALSE FALSE ...
##   ..$ is_primary_doc             : logi [1:98] NA NA NA NA NA NA ...
##   ..$ may_contradict_core_dataset: logi [1:98] NA NA NA NA NA NA ...
##   ..$ manifesto_id               : chr [1:98] NA NA NA NA ...
##   ..$ md5sum_text                : chr [1:98] NA NA NA NA ...
##   ..$ url_original               : chr [1:98] "/down/originals/2023-
1/51320_1945.pdf" "/down/originals/2023-1/51420_1945.pdf"
"/down/originals/2023-1/51620_1945.pdf" "/down/originals/2023-
1/51320_1950.pdf" ...
##   ..$ md5sum_original            : chr [1:98]
"9ed092419212878b34a602c0014d7c32" "634886d4820ad2b896c15527a5ed7f2d"
"fea8e99005f272abb93f32e1745e7621" "c50581f9acb353a5ca463ff373c4734e" ...
##   ..$ annotations                : logi [1:98] NA NA NA NA NA NA ...
##   ..$ handbook                   : chr [1:98] NA NA NA NA ...
##   ..$ is_copy_of                 : chr [1:98] NA NA NA NA ...
##   ..$ title                      : chr [1:98] "Let us face the future: a
declaration of Labour policy for the consideration of the nation" "20-point
manifesto of the Liberal Party" "Mr Churchill's declaration of policy to the
electors" "Let us win through together: a declaration of Labour policy for
the consideration of the nation" ...
##  - attr(*, "date")= chr "Sat Oct 28 10:08:17 2023"
##  - attr(*, "corpus_version")= chr "2023-1"
```

```
# Let's focus on the British manifestos of the 2019 elections
uk19 <- mp_corpus(countryname=="United Kingdom" & date == 201912)
```

```
## Connecting to Manifesto Project DB API... corpus version: 2023-1
```

```
uk19
```

```
## <<ManifestoCorpus>>
## Metadata:  corpus specific: 0, document level (indexed): 0
## Content:  documents: 10
```

```
summary(uk19)
```

```
##               Length Class             Mode
## 51110_201912 1380   ManifestoDocument list
## 51210_201912  136   ManifestoDocument list
## 51320_201912 1810   ManifestoDocument list
## 51340_201912  539   ManifestoDocument list
## 51421_201912 1552   ManifestoDocument list
## 51430_201912  680   ManifestoDocument list
## 51620_201912 1299   ManifestoDocument list
## 51901_201912 1081   ManifestoDocument list
## 51902_201912 1233   ManifestoDocument list
## 51903_201912  617   ManifestoDocument list
```

```
head(content(uk19[["51110_201912"]]))
```

```
## [1] "Foreword"
## [2] "The time to vote Green is now."
## [3] "We know these are dark days."
## [4] "The threat of Brexit hangs over us"
## [5] "and our democracy is under attack."
## [6] "Above all, the climate and environmental emergency rages from the
Amazon to the Arctic."
```

```
cmp <- mp_maindataset() # let's download the CMP core dataset
View(cmp)
uk_cmp <- cmp[ which(cmp$countryname=="United Kingdom" & cmp$date==201912),]
# select name of country and elections
print(uk_cmp [c("partyname", "party", "edate", "date")])
```

```
## # A tibble: 10 × 4
##    partyname                          party edate        date
##    <chr>                              <dbl> <date>      <dbl>
##  1 Green Party of England and Wales   51110 2019-12-12 201912
##  2 We Ourselves                       51210 2019-12-12 201912
##  3 Labour Party                       51320 2019-12-12 201912
##  4 Social Democratic and Labour Party 51340 2019-12-12 201912
##  5 Liberal Democrats                  51421 2019-12-12 201912
##  6 Alliance Party of Northern Ireland 51430 2019-12-12 201912
##  7 Conservative Party                 51620 2019-12-12 201912
##  8 The Party of Wales                 51901 2019-12-12 201912
##  9 Scottish National Party            51902 2019-12-12 201912
## 10 Democratic Unionist Party          51903 2019-12-12 201912
```

```
# converting the 10 party manifestoes recovered from the CMP dataset to a
Quanteda corpus
```

```r
quanteda_uk_party <- corpus(uk19)
summary(head(quanteda_uk_party ))
```

```
## Corpus consisting of 6 documents, showing 6 documents:
##
##   Text Types Tokens Sentences manifesto_id party   date language source
##  text1  4320  37876        55 51110_201912 51110 201912  english MARPOR
##  text2   824   3381         1 51210_201912 51210 201912  english MARPOR
##  text3  4602  43212         1 51320_201912 51320 201912  english MARPOR
##  text4  2352  13956         3 51340_201912 51340 201912  english MARPOR
##  text5  4654  43092         5 51421_201912 51421 201912  english MARPOR
##  text6  2692  18498         1 51430_201912 51430 201912  english MARPOR
##  has_eu_code is_primary_doc may_contradict_core_dataset
##        FALSE           TRUE                      FALSE
##        FALSE           TRUE                      FALSE
##        FALSE           TRUE                      FALSE
##        FALSE           TRUE                      FALSE
##        FALSE           TRUE                      FALSE
##        FALSE           TRUE                      FALSE
##                       md5sum_text                           url_original
##  33ea9f1611ba9f4fc9bc98cc6dd5422d /down/originals/2020-1/51110_2019.pdf
##  c8c32510e9df570a556c59822bc7422c /down/originals/2020-1/51210_2019.pdf
##  0da2149574a0dcc067abaf223e91b9ab /down/originals/2020-1/51320_2019.pdf
##  1eaab709947b042b7ed1000bbbcfe09d /down/originals/2020-1/51340_2019.pdf
##  436ce3b29af9e0b23ef0f0ea543db9c7 /down/originals/2020-1/51421_2019.pdf
##  a32d6fbabf19bf6044552da86c8c1e22 /down/originals/2020-1/51430_2019.pdf
##                   md5sum_original annotations handbook is_copy_of
##  db0d3e814bdbeed362ea81e53066dc37        TRUE        5       <NA>
##  1201b63b1ef643cc8e178b72e629a10a        TRUE        5       <NA>
##  b92e0bf8d1202c474c16f8f3f6b3925a        TRUE        5       <NA>
##  99d6e035cf66103f57075215f8233a06        TRUE        5       <NA>
##  de1d8528b492ef56f25920534310e4d5        TRUE        5       <NA>
##  a252c96c570d84baf57f0102ff83ac81        TRUE        5       <NA>
##                               title           id
##                   If not now, when? 51110_201912
##                      Time for unity 51210_201912
##          It's time for real change  51320_201912
##             Stop Boris, stop Brexit 51340_201912
##  Stop Brexit build a brighter future 51421_201912
##                      Demand better. 51430_201912
```

```r
ndoc(quanteda_uk_party )
```

```
## [1] 10
```

```r
# let's add the party labels to the doc vars!
uk_cmp$partyname
```

```
##  [1] "Green Party of England and Wales"   "We Ourselves"
##  [3] "Labour Party"                       "Social Democratic and Labour
```

```
Party"
##  [5] "Liberal Democrats"                  "Alliance Party of Northern
Ireland"
##  [7] "Conservative Party"                 "The Party of Wales"
##  [9] "Scottish National Party"            "Democratic Unionist Party"

uk_cmp$party

##  [1] 51110 51210 51320 51340 51421 51430 51620 51901 51902 51903

quanteda_uk_party  $party2 <-uk_cmp$partyname
quanteda_uk_party  $party_label<-uk_cmp$party


# let's also rename the documents in the corpus according to party labels
docnames(quanteda_uk_party) <- uk_cmp$partyname
summary(head(quanteda_uk_party))

## Corpus consisting of 6 documents, showing 6 documents:
##
##                                Text Types Tokens Sentences manifesto_id
party
##    Green Party of England and Wales  4320  37876        55 51110_201912
51110
##                        We Ourselves   824   3381         1 51210_201912
51210
##                        Labour Party  4602  43212         1 51320_201912
51320
##  Social Democratic and Labour Party  2352  13956         3 51340_201912
51340
##                   Liberal Democrats  4654  43092         5 51421_201912
51421
##  Alliance Party of Northern Ireland  2692  18498         1 51430_201912
51430
##    date language source has_eu_code is_primary_doc
may_contradict_core_dataset
##  201912  english MARPOR       FALSE           TRUE
FALSE
##  201912  english MARPOR       FALSE           TRUE
FALSE
##  201912  english MARPOR       FALSE           TRUE
FALSE
##  201912  english MARPOR       FALSE           TRUE
FALSE
##  201912  english MARPOR       FALSE           TRUE
FALSE
##  201912  english MARPOR       FALSE           TRUE
FALSE
##                         md5sum_text                            url_original
##  33ea9f1611ba9f4fc9bc98cc6dd5422d /down/originals/2020-1/51110_2019.pdf
##  c8c32510e9df570a556c59822bc7422c /down/originals/2020-1/51210_2019.pdf
```

```
##  0da2149574a0dcc067abaf223e91b9ab /down/originals/2020-1/51320_2019.pdf
##  1eaab709947b042b7ed1000bbbcfe09d /down/originals/2020-1/51340_2019.pdf
##  436ce3b29af9e0b23ef0f0ea543db9c7 /down/originals/2020-1/51421_2019.pdf
##  a32d6fbabf19bf6044552da86c8c1e22 /down/originals/2020-1/51430_2019.pdf
##                   md5sum_original annotations handbook is_copy_of
##  db0d3e814bdbeed362ea81e53066dc37        TRUE        5       <NA>
##  1201b63b1ef643cc8e178b72e629a10a        TRUE        5       <NA>
##  b92e0bf8d1202c474c16f8f3f6b3925a        TRUE        5       <NA>
##  99d6e035cf66103f57075215f8233a06        TRUE        5       <NA>
##  de1d8528b492ef56f25920534310e4d5        TRUE        5       <NA>
##  a252c96c570d84baf57f0102ff83ac81        TRUE        5       <NA>
##                                 title           id
##                    If not now, when? 51110_201912
##                       Time for unity 51210_201912
##           It's time for real change  51320_201912
##              Stop Boris, stop Brexit 51340_201912
##  Stop Brexit build a brighter future 51421_201912
##                       Demand better. 51430_201912
##                                party2 party_label
##    Green Party of England and Wales       51110
##                         We Ourselves       51210
##                         Labour Party       51320
##  Social Democratic and Labour Party       51340
##                    Liberal Democrats       51421
##  Alliance Party of Northern Ireland       51430

# let's tokenize the manifestos
tok_uk <- tokens(quanteda_uk_party ,  remove_punct = TRUE,
remove_numbers=TRUE, remove_symbols = TRUE, split_hyphens = TRUE,
remove_separators = TRUE, remove_url = TRUE)
tok_uk <- tokens_remove(tok_uk , stopwords("en"))
tok_uk <- tokens_wordstem (tok_uk )
# computing the DFM
dfm_uk <- dfm(tok_uk )
dfm_uk <- dfm_remove(dfm_uk, stopwords('en'), min_nchar = 2)
head(docvars(dfm_uk ))

##   manifesto_id party   date language source has_eu_code is_primary_doc
## 1 51110_201912 51110 201912  english MARPOR       FALSE           TRUE
## 2 51210_201912 51210 201912  english MARPOR       FALSE           TRUE
## 3 51320_201912 51320 201912  english MARPOR       FALSE           TRUE
## 4 51340_201912 51340 201912  english MARPOR       FALSE           TRUE
## 5 51421_201912 51421 201912  english MARPOR       FALSE           TRUE
## 6 51430_201912 51430 201912  english MARPOR       FALSE           TRUE
##   may_contradict_core_dataset                       md5sum_text
## 1                       FALSE 33ea9f1611ba9f4fc9bc98cc6dd5422d
## 2                       FALSE c8c32510e9df570a556c59822bc7422c
## 3                       FALSE 0da2149574a0dcc067abaf223e91b9ab
## 4                       FALSE 1eaab709947b042b7ed1000bbbcfe09d
## 5                       FALSE 436ce3b29af9e0b23ef0f0ea543db9c7
```

```
## 6                       FALSE a32d6fbabf19bf6044552da86c8c1e22
##                            url_original                  md5sum_original
## 1 /down/originals/2020-1/51110_2019.pdf db0d3e814bdbeed362ea81e53066dc37
## 2 /down/originals/2020-1/51210_2019.pdf 1201b63b1ef643cc8e178b72e629a10a
## 3 /down/originals/2020-1/51320_2019.pdf b92e0bf8d1202c474c16f8f3f6b3925a
## 4 /down/originals/2020-1/51340_2019.pdf 99d6e035cf66103f57075215f8233a06
## 5 /down/originals/2020-1/51421_2019.pdf de1d8528b492ef56f25920534310e4d5
## 6 /down/originals/2020-1/51430_2019.pdf a252c96c570d84baf57f0102ff83ac81
##   annotations handbook is_copy_of                              title
## 1        TRUE        5       <NA>                  If not now, when?
## 2        TRUE        5       <NA>                     Time for unity
## 3        TRUE        5       <NA>          It's time for real change
## 4        TRUE        5       <NA>             Stop Boris, stop Brexit
## 5        TRUE        5       <NA> Stop Brexit build a brighter future
## 6        TRUE        5       <NA>                       Demand better.
##              id                               party2 party_label
## 1 51110_201912   Green Party of England and Wales       51110
## 2 51210_201912                       We Ourselves       51210
## 3 51320_201912                       Labour Party       51320
## 4 51340_201912 Social Democratic and Labour Party       51340
## 5 51421_201912                  Liberal Democrats       51421
## 6 51430_201912 Alliance Party of Northern Ireland       51430
```

newsmap

```
# let's create a dictionary of seed-words via the "dictionary" function of
Quanteda and let's apply it to our dfm

dict <- dictionary(list(
                economy = c("inflation", "econ*", "debt", "trade", "income",
"market", "currency", "gdp", "budget"),
                migration = c("migration", "immigration", "refugee",
"migrant", "asylum", "divers*"),
                climate = c("climate", "warming", "pollut*", "environment",
"green"),
                health_care = c("nhs", "health", "medic*"),
                security = c("arms", "secur*", "weapon", "military" )
))

dict

## Dictionary object with 5 key entries.
## - [economy]:
##   - inflation, econ*, debt, trade, income, market, currency, gdp, budget
## - [migration]:
##   - migration, immigration, refugee, migrant, asylum, divers*
## - [climate]:
##   - climate, warming, pollut*, environment, green
## - [health_care]:
```

```
##   - nhs, health, medic*
## - [security]:
##   - arms, secur*, weapon, military

label <- dfm_lookup(dfm_uk, dictionary = dict)
label

## Document-feature matrix of: 10 documents, 5 features (4.00% sparse) and 18
docvars.
##                                     features
## docs                                 economy migration climate health_care
##   Green Party of England and Wales       104        18     216          57
##   We Ourselves                             4         0       1           2
##   Labour Party                           104        11      68         111
##   Social Democratic and Labour Party      46         1      16          39
##   Liberal Democrats                      131        29      46         169
##   Alliance Party of Northern Ireland      92        15      16          10
##                                     features
## docs                                 security
##   Green Party of England and Wales         41
##   We Ourselves                              0
##   Labour Party                             69
##   Social Democratic and Labour Party       16
##   Liberal Democrats                        18
##   Alliance Party of Northern Ireland       19
## [ reached max_ndoc ... 4 more documents ]

# let's train the model
model_en <- textmodel_newsmap(dfm_uk, label)
# now all the words of our texts, including those not included in the seed-
words, get a value!

predict(model_en)

##   Green Party of England and Wales                        We Ourselves
##                            climate                             economy
##                       Labour Party Social Democratic and Labour Party
##                        health_care                         health_care
##                  Liberal Democrats Alliance Party of Northern Ireland
##                            climate                             economy
##                 Conservative Party                 The Party of Wales
##                            economy                             climate
##            Scottish National Party          Democratic Unionist Party
##                        health_care                             climate
## Levels: economy migration climate health_care security
```

keyATM

```
library(keyATM)
```

```
## keyATM 0.5.0 successfully loaded.
##  Papers, examples, resources, and other materials are at
##  https://keyatm.github.io/keyATM/
```

```
library(ggplot2)
```

```
##
## Attaching package: 'ggplot2'
```

```
## The following object is masked from 'package:NLP':
##
##     annotate
```

```
library(cowplot)
```

```
table(ntoken(dfm_uk) > 0)
```

```
##
## TRUE
##   10
```

```
keyATM_docs <- keyATM_read(texts = dfm_uk)
```

```
## ℹ Using quanteda dfm.
```

```
summary(keyATM_docs)
```

```
## keyATM_docs object of 10 documents.
```

```
## • Average (min/max) document length: 10654.1 (1215/17418) words
```

```
## • Number of unique words: 5786
```

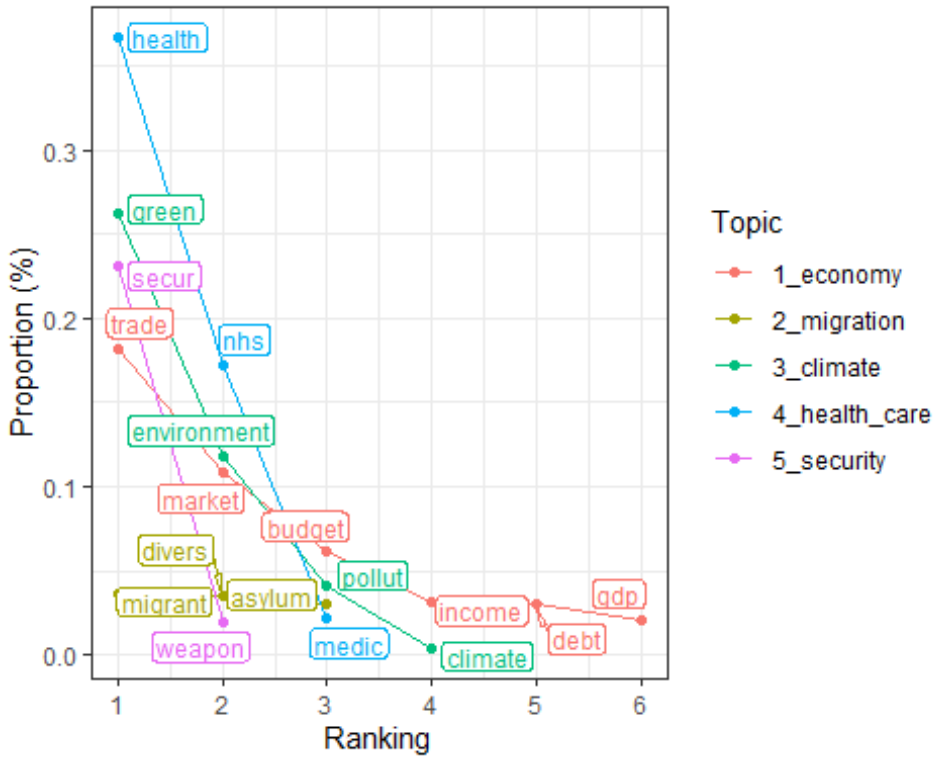
```
keywords <- list(
                economy = c("inflation", "econ", "debt", "trade", "income",
"market", "currency", "gdp", "budget"),
                migration = c("migration", "immigration", "refugee",
"migrant", "asylum", "divers"),
                climate = c("climate", "warming", "pollut", "environment",
"green"),
                health_care = c("nhs", "health", "medic"),
                security = c("arms", "secur", "weapon", "military"))
keywords
```

```
## $economy
## [1] "inflation" "econ"      "debt"      "trade"     "income"    "market"
## [7] "currency"  "gdp"       "budget"
##
## $migration
## [1] "migration"   "immigration" "refugee"     "migrant"     "asylum"
## [6] "divers"
##
## $climate
## [1] "climate"     "warming"     "pollut"      "environment" "green"
##
## $health_care
## [1] "nhs"    "health" "medic"
##
## $security
## [1] "arms"     "secur"    "weapon"   "military"
```

```
key_viz <- visualize_keywords(docs = keyATM_docs, keywords = keywords)
```

```
## Warning: Keywords are pruned because they do not appear in the documents:
inflation,
## econ, currency, migration, immigration, refugee, warming, arms, and
military
```

```
key_viz
```




```
values_fig(key_viz)
```

```
## # A tibble: 18 × 5
## # Groups:   Topic [5]
##    Word        WordCount `Proportion(%)` Ranking Topic
##    <chr>           <int>           <dbl>   <int> <fct>
##  1 trade             194           0.182       1 1_economy
##  2 market            115           0.108       2 1_economy
##  3 budget             65           0.061       3 1_economy
##  4 income             34           0.032       4 1_economy
##  5 debt               32           0.03        5 1_economy
##  6 gdp                22           0.021       6 1_economy
##  7 migrant            38           0.036       1 2_migration
##  8 divers             37           0.035       2 2_migration
##  9 asylum             32           0.03        3 2_migration
## 10 green             279           0.262       1 3_climate
## 11 environment       126           0.118       2 3_climate
## 12 pollut             44           0.041       3 3_climate
## 13 climate             4           0.004       4 3_climate
## 14 health            391           0.367       1 4_health_care
## 15 nhs               183           0.172       2 4_health_care
## 16 medic              23           0.022       3 4_health_care
## 17 secur             246           0.231       1 5_security
## 18 weapon             21           0.02        2 5_security
```

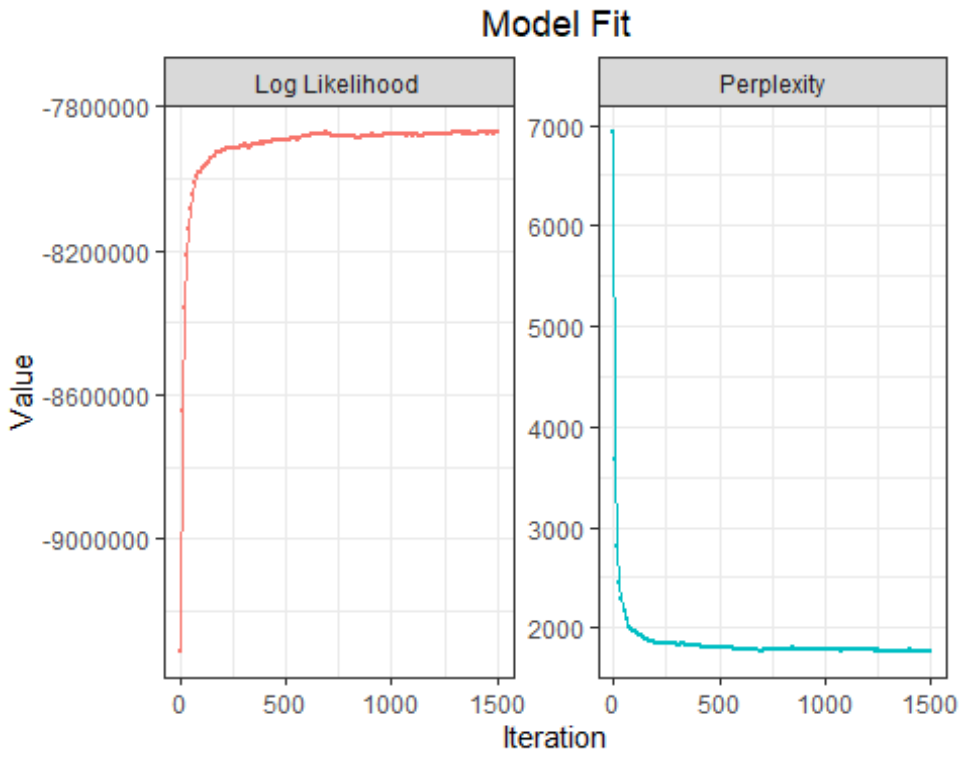
```
system.time(out <- keyATM(docs = keyATM_docs,
              no_keyword_topics = 1,
              keywords          = keywords,
              model             = "base",
              options           = list(seed = 123)))
```

```
## ⠹ Initializing the model
```

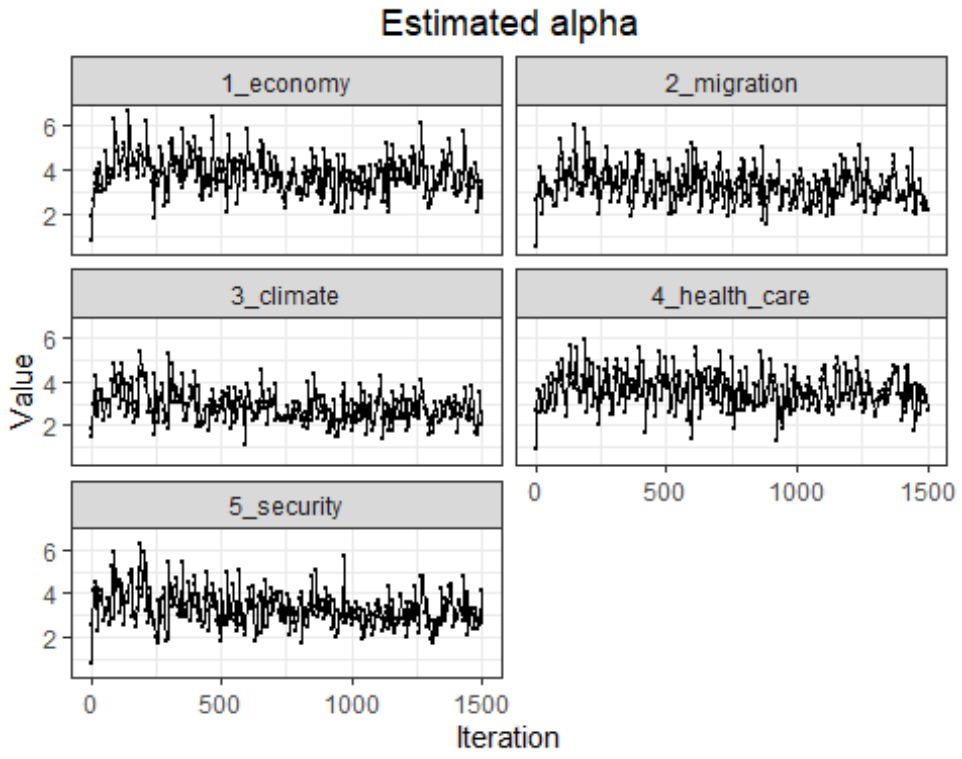
```
## Warning: Keywords are pruned because they do not appear in the documents:
inflation,
## econ, currency, migration, immigration, refugee, warming, arms, and
military
```

```
##                        3bu info@mydup.com
## 1_economy     4.301730e-05   4.301730e-05
## 2_migration   6.890307e-07   6.890307e-07
## 3_climate     6.025015e-07   6.025015e-07
## 4_health_care 4.123490e-07   4.123490e-07
## 5_security    6.236813e-07   6.236813e-07
## Other_1       8.317489e-07   8.317489e-07
```

```
plot_modelfit(out) # If the model is working as expected, we would observe an
increase trend for the log-likelihood and a decrease trend for the perplexity
```

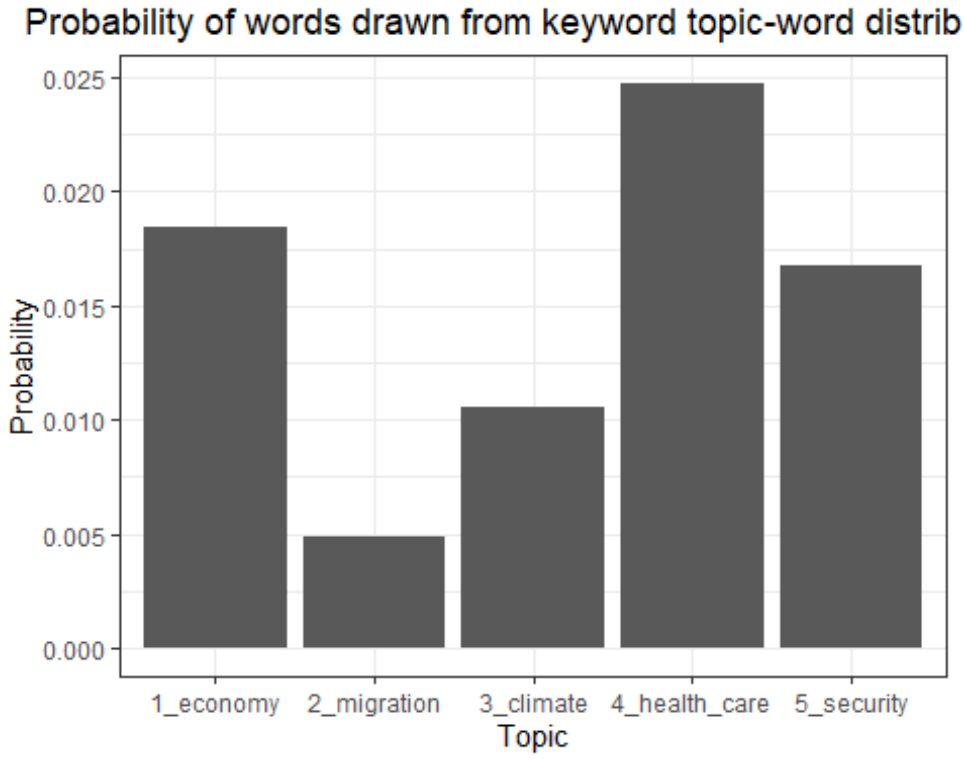



```
plot_alpha(out)
```



```
plot_pi(out) #keywords for migration are not representative thus better be replaced with more frequently appearing keywords. Keywords for climate topic can be reconsidered as well.
```

```
## ℹ Plotting pi from the final MCMC draw. Please set `store_pi` to `TRUE` if you want to plot pi over iterations.
```



Adding Covariate(s): Plitical Left-Right dimension applied

```
cmp<-mp_maindataset()
dimension <- cmp$rile

system.time(out <- keyATM(docs              = keyATM_docs,
              no_keyword_topics = 1,
              keywords          = keywords,
              model             = "covariates",
              model_settings    = list(covariates_data    = dimension  ,
                                       covariates_formula = ~ dimension ),
              options           = list(seed = 123),
                keep              = c("Z", "S")  ))
```

```
## ℹ Convert covariates data using `model_settings$covariates_formula`.
```

```
## ⠹ Initializing the model
```

```
##    user  system elapsed
##  104.57   17.69  125.20
```

```
covariates_info(out)
```

```
## Colnames: (Intercept), dimension
## Standardization: non-factor
## Formula: ~ dimension
##
## Preview:
##   (Intercept) dimension
## 1           1      9.60
## 2           1    -37.80
## 3           1      9.50
## 4           1     28.00
## 5           1     23.81
## 6           1    -44.00
```

```
#parties are placed along the Political Left-Right dimension: 2 and 6 are being extreme Leftist, 4 and 6 are extreme Rightist, and 1 and 3 are moderate Centre-Rightist
```