Building a corpus from a character vector

The simplest case is to create a corpus from a vector of texts already in memory in R. This gives the advanced R user complete flexibility with his or her choice of text inputs, as there are almost endless ways to get a vector of texts into R.

If we already have the texts in this form, we can call the corpus constructor function directly. We can demonstrate this on the built-in character object of the texts about immigration policy extracted from the 2010 election manifestos of the UK political parties (called `data_char_ukimmig2010`).

```
corp_uk <- corpus(data_char_ukimmig2010)  # build a new corpus from the texts
summary(corp_uk)
```

```
## Corpus consisting of 9 documents, showing 9 documents:
##
##          Text Types Tokens Sentences
##           BNP  1125   3280        88
##     Coalition   142    260         4
##  Conservative   251    499        15
##        Greens   322    677        21
##        Labour   298    680        29
##        LibDem   251    483        14
##            PC    77    114         5
##           SNP    88    134         4
##          UKIP   346    722        26
```

If we wanted, we could add some document-level variables – what quanteda calls *docvars* – to this corpus.

We can do this using the R's `names()` function to get the names of the character vector `data_char_ukimmig2010`, and assign this to a document variable (*docvar*).

```
docvars(corp_uk, "Party") <- names(data_char_ukimmig2010)
docvars(corp_uk, "Year") <- 2010
summary(corp_uk)
```

```
## Corpus consisting of 9 documents, showing 9 documents:
##
##          Text Types Tokens Sentences        Party Year
##           BNP  1125   3280        88          BNP 2010
##     Coalition   142    260         4    Coalition 2010
##  Conservative   251    499        15 Conservative 2010
##        Greens   322    677        21       Greens 2010
##        Labour   298    680        29       Labour 2010
##        LibDem   251    483        14       LibDem 2010
##            PC    77    114         5           PC 2010
##           SNP    88    134         4          SNP 2010
##          UKIP   346    722        26         UKIP 2010
```

Loading in files using the readtext package

```
require(readtext)

# Twitter json
dat_json <- readtext("~/Dropbox/QUANTESS/social media/zombies/tweets.json")
corp_twitter <- corpus(dat_json)
summary(corp_twitter, 5)
# generic json - needs a textfield specifier
dat_sotu <- readtext("~/Dropbox/QUANTESS/Manuscripts/collocations/Corpora/sotu/sotu.json",
    textfield = "text")
summary(corpus(dat_sotu), 5)
# text file
dat_txtone <- readtext("~/Dropbox/QUANTESS/corpora/project_gutenberg/pg2701.txt",
    cache = FALSE)
summary(corpus(dat_txtone), 5)
# multiple text files
dat_txtmultiple1 <- readtext("~/Dropbox/QUANTESS/corpora/inaugural/*.txt", cache = FALSE)
summary(corpus(dat_txtmultiple1), 5)
# multiple text files with docvars from filenames
dat_txtmultiple2 <- readtext("~/Dropbox/QUANTESS/corpora/inaugural/*.txt", docvarsfrom = "filenames",
    sep = "-", docvarnames = c("Year", "President"))
summary(corpus(dat_txtmultiple2), 5)
# XML data
dat_xml <- readtext("~/Dropbox/QUANTESS/quanteda_working_files/xmlData/plant_catalog.xml",
    textfield = "COMMON")
summary(corpus(dat_xml), 5)
# csv file
write.csv(data.frame(inaug_speech = as.character(data_corpus_inaugural), docvars(data_corpus_inaugural)),
    file = "/tmp/inaug_texts.csv", row.names = FALSE)
dat_csv <- readtext("/tmp/inaug_texts.csv", textfield = "inaug_speech")
summary(corpus(dat_csv), 5)
```

How a quanteda corpus works

Corpus principles

A corpus is designed to be a "library" of original documents that have been converted to plain, UTF-8 encoded text, and stored along with meta-data at the corpus level and at the document-level. We have a special name for document-level meta-data: *docvars*. These are variables or features that describe attributes of each document.

A corpus is designed to be a more or less static container of texts with respect to processing and analysis. This means that the texts in corpus are not designed to be changed internally through (for example) cleaning or pre-processing steps, such as stemming or removing punctuation. Rather, texts can be extracted from the corpus as part of processing, and assigned to new objects, but the idea is that the corpus will remain as an original reference copy so that other analyses – for instance those in which stems and punctuation were required, such as analyzing a reading ease index – can be performed on the same corpus.

To extract texts from a corpus, we simply coerce this to a plain character type, using `as.character()`.

```
as.character(data_corpus_inaugural)[2]
```

```
##
## "Fellow citizens, I am again called upon by the voice of my country to execute the functions of its Chief Magistrat
```

To summarize the texts from a corpus, we can call a `summary()` method defined for a corpus.

```
summary(data_corpus_inaugural, n = 5)
```

```
## Corpus consisting of 59 documents, showing 5 documents:
##
##             Text Types Tokens Sentences Year  President FirstName
##  1789-Washington   625   1537        23 1789 Washington    George
##  1793-Washington    96    147         4 1793 Washington    George
##       1797-Adams   826   2577        37 1797      Adams      John
##   1801-Jefferson   717   1923        41 1801  Jefferson    Thomas
##   1805-Jefferson   804   2380        45 1805  Jefferson    Thomas
##                  Party
##                   none
##                   none
##             Federalist
##  Democratic-Republican
##  Democratic-Republican
```

We can save the output from the summary command as a data frame, and plot some basic descriptive statistics with this information:

```
tokeninfo <- summary(data_corpus_inaugural)
tokeninfo$Year <- docvars(data_corpus_inaugural, "Year")
if (require(ggplot2)) ggplot(data = tokeninfo, aes(x = Year, y = Tokens, group = 1)) +
    geom_line() + geom_point() + scale_x_continuous(labels = c(seq(1789, 2017, 12)),
    breaks = seq(1789, 2017, 12)) + theme_bw()
```

```
## Loading required package: ggplot2
```


```
# Longest inaugural address: William Henry Harrison
tokeninfo[which.max(tokeninfo$Tokens), ]
```

```
##             Text Types Tokens Sentences Year President     FirstName Party
## 14 1841-Harrison  1898   9123       210 1841  Harrison William Henry  Whig
```

Tools for handling corpus objects

Adding two corpus objects together

The `+` operator provides a simple method for concatenating two corpus objects. If they contain different sets of

document-level variables, these will be stitched together in a fashion that guarantees that no information is lost. Corpus-level meta-data is also concatenated.

```
corp1 <- corpus(data_corpus_inaugural[1:5])
corp2 <- corpus(data_corpus_inaugural[53:58])
corp3 <- corp1 + corp2
summary(corp3)
```

```
## Corpus consisting of 11 documents, showing 11 documents:
##
##             Text Types Tokens Sentences Year  President FirstName
##  1789-Washington   625   1537        23 1789 Washington    George
##  1793-Washington    96    147         4 1793 Washington    George
##       1797-Adams   826   2577        37 1797      Adams      John
##   1801-Jefferson   717   1923        41 1801  Jefferson    Thomas
##   1805-Jefferson   804   2380        45 1805  Jefferson    Thomas
##     1997-Clinton   773   2436       111 1997    Clinton       Bill
##        2001-Bush   621   1806        97 2001       Bush George W.
##        2005-Bush   772   2312        99 2005       Bush George W.
##       2009-Obama   938   2689       110 2009      Obama    Barack
##       2013-Obama   814   2317        88 2013      Obama    Barack
##       2017-Trump   582   1660        88 2017      Trump Donald J.
##                  Party
##                   none
##                   none
##             Federalist
##  Democratic-Republican
##  Democratic-Republican
##             Democratic
##             Republican
##             Republican
##             Democratic
##             Democratic
##             Republican
```

Subsetting corpus objects

There is a method of the `corpus_subset()` function defined for corpus objects, where a new corpus can be extracted based on logical conditions applied to *docvars*:

```
summary(corpus_subset(data_corpus_inaugural, Year > 1990))
```

```
## Corpus consisting of 8 documents, showing 8 documents:
##
##            Text Types Tokens Sentences Year President FirstName      Party
##    1993-Clinton   642   1833        81 1993   Clinton       Bill Democratic
##    1997-Clinton   773   2436       111 1997   Clinton       Bill Democratic
##       2001-Bush   621   1806        97 2001      Bush George W. Republican
##       2005-Bush   772   2312        99 2005      Bush George W. Republican
##      2009-Obama   938   2689       110 2009     Obama    Barack Democratic
##      2013-Obama   814   2317        88 2013     Obama    Barack Democratic
##      2017-Trump   582   1660        88 2017     Trump Donald J. Republican
##  2021-Biden.txt   811   2766       216 2021     Biden Joseph R. Democratic
```

```
summary(corpus_subset(data_corpus_inaugural, President == "Adams"))
```

```
## Corpus consisting of 2 documents, showing 2 documents:
##
##        Text Types Tokens Sentences Year President   FirstName
##  1797-Adams   826   2577        37 1797     Adams        John
##  1825-Adams  1003   3147        74 1825     Adams John Quincy
##                 Party
##             Federalist
##  Democratic-Republican
```

Exploring corpus texts

The `kwic` function (keywords-in-context) performs a search for a word and allows us to view the contexts in which it occurs:

```
data_tokens_inaugural <- tokens(data_corpus_inaugural)
kwic(data_tokens_inaugural, pattern = "terror")
```

```
## Keyword-in-context with 8 matches.
##     [1797-Adams, 1324]              fraud or violence, by | terror |
##  [1933-Roosevelt, 111] nameless, unreasoning, unjustified | terror |
##  [1941-Roosevelt, 285]      seemed frozen by a fatalistic | terror |
##    [1961-Kennedy, 850]    alter that uncertain balance of | terror |
##     [1981-Reagan, 811]     freeing all Americans from the | terror |
##   [1997-Clinton, 1047]        They fuel the fanaticism of | terror |
##   [1997-Clinton, 1647]  maintain a strong defense against | terror |
##     [2009-Obama, 1619]     advance their aims by inducing | terror |
##
##  , intrigue, or venality
##  which paralyzes needed efforts to
##  , we proved that this
##  that stays the hand of
##  of runaway living costs.
##  . And they torment the
##  and destruction. Our children
##  and slaughtering innocents, we
```

```
kwic(data_tokens_inaugural, pattern = "terror", valuetype = "regex")
```

```
## Keyword-in-context with 12 matches.
##     [1797-Adams, 1324]                   fraud or violence, by |  terror   |
##  [1933-Roosevelt, 111]      nameless, unreasoning, unjustified |  terror   |
##  [1941-Roosevelt, 285]           seemed frozen by a fatalistic |  terror   |
##    [1961-Kennedy, 850]         alter that uncertain balance of |  terror   |
##    [1961-Kennedy, 972]               of science instead of its |  terrors  |
##     [1981-Reagan, 811]          freeing all Americans from the |  terror   |
##    [1981-Reagan, 2186]        understood by those who practice | terrorism |
##   [1997-Clinton, 1047]             They fuel the fanaticism of |  terror   |
##   [1997-Clinton, 1647]       maintain a strong defense against |  terror   |
##     [2009-Obama, 1619]          advance their aims by inducing |  terror   |
##     [2017-Trump, 1117] civilized world against radical Islamic | terrorism |
##  [2021-Biden.txt, 544]             , white supremacy, domestic | terrorism |
##
##  , intrigue, or venality
##  which paralyzes needed efforts to
##  , we proved that this
##  that stays the hand of
##  . Together let us explore
##  of runaway living costs.
##  and prey upon their neighbors
##  . And they torment the
##  and destruction. Our children
##  and slaughtering innocents, we
##  , which we will eradicate
##  that we must confront and
```

```
kwic(data_tokens_inaugural, pattern = "communist*")
```

```
## Keyword-in-context with 2 matches.
##   [1949-Truman, 832] the actions resulting from the | Communist  |
##  [1961-Kennedy, 510]     required - not because the | Communists |
##
##  philosophy are a threat to
##  may be doing it,
```

Using `phrase()` we can also look up multi-word expressions.

```
kwic(data_tokens_inaugural, pattern = phrase("United States")) %>% head()  # show context of the first six occurrences
```

```
## Keyword-in-context with 6 matches.
##  [1789-Washington, 433:434]            of the people of the | United States |
##  [1789-Washington, 529:530]          more than those of the | United States |
##       [1797-Adams, 524:525]     saw the Constitution of the | United States |
##     [1797-Adams, 1716:1717]      to the Constitution of the | United States |
##     [1797-Adams, 2480:2481] support the Constitution of the | United States |
##   [1805-Jefferson, 441:442]       sees a taxgatherer of the | United States |
##
##  a Government instituted by themselves
##  . Every step by which
##  in a foreign country.
##  , and a conscientious determination
##  , I entertain no doubt
##  ? These contributions enable us
```

In the above summary, `Year` and `President` are variables associated with each document. We can access such variables with the `docvars()` function.

```
# inspect the document-level variables
head(docvars(data_corpus_inaugural))
```

```
##   Year  President FirstName                Party
## 1 1789 Washington    George                 none
## 2 1793 Washington    George                 none
## 3 1797      Adams      John            Federalist
## 4 1801  Jefferson    Thomas Democratic-Republican
## 5 1805  Jefferson    Thomas Democratic-Republican
## 6 1809    Madison     James Democratic-Republican
```

More corpora are available from the quanteda.corpora (https://github.com/quanteda/quanteda.corpora) package.

Extracting Features from a Corpus

In order to perform statistical analysis such as document scaling, we must extract a matrix associating values for certain features with each document. In quanteda, we use the `dfm()` function to produce such a matrix. "dfm" is short for *document-feature matrix*, and always refers to documents in rows and "features" as columns. We fix this dimensional orientation because it is standard in data analysis to have a unit of analysis as a row, and features or variables pertaining to each unit as columns. We call them "features" rather than terms, because features are more general than terms: they can be defined as raw terms, stemmed terms, the parts of speech of terms, terms after stopwords have been removed, or a dictionary class to which a term belongs. Features can be entirely general, such as ngrams or syntactic dependencies, and we leave this open-ended.

Tokenizing texts

To simply tokenize a text, quanteda provides a powerful command called `tokens()`. This produces an intermediate object, consisting of a list of tokens in the form of character vectors, where each element of the list corresponds to an input document.

`tokens()` is deliberately conservative, meaning that it does not remove anything from the text unless told to do so.

```
txt <- c(text1 = "This is $10 in 999 different ways,\n up and down; left and right!",
    text2 = "@kenbenoit working: on #quanteda 2day\t4ever, http://textasdata.com?page=123.")
tokens(txt)
```

```
## Tokens consisting of 2 documents.
## text1 :
##  [1] "This"      "is"        "$"         "10"        "in"        "999"
##  [7] "different" "ways"      ","         "up"        "and"       "down"
## [ ... and 5 more ]
##
## text2 :
## [1] "@kenbenoit"                     "working"
## [3] ":"                              "on"
## [5] "#quanteda"                      "2day"
## [7] "4ever"                          ","
## [9] "http://textasdata.com?page=123."
```

```
tokens(txt, remove_numbers = TRUE, remove_punct = TRUE)
```

```
## Tokens consisting of 2 documents.
## text1 :
##  [1] "This"      "is"        "$"         "in"        "different" "ways"
##  [7] "up"        "and"       "down"      "left"      "and"       "right"
##
## text2 :
## [1] "@kenbenoit"                     "working"
## [3] "on"                             "#quanteda"
## [5] "2day"                           "4ever"
## [7] "http://textasdata.com?page=123."
```

```
tokens(txt, remove_numbers = FALSE, remove_punct = TRUE)
```

```
## Tokens consisting of 2 documents.
## text1 :
##  [1] "This"      "is"        "$"         "10"        "in"        "999"
##  [7] "different" "ways"      "up"        "and"       "down"      "left"
## [ ... and 2 more ]
##
## text2 :
## [1] "@kenbenoit"                     "working"
## [3] "on"                             "#quanteda"
## [5] "2day"                           "4ever"
## [7] "http://textasdata.com?page=123."
```

```
tokens(txt, remove_numbers = TRUE, remove_punct = FALSE)
```

```
## Tokens consisting of 2 documents.
## text1 :
##  [1] "This"      "is"        "$"         "in"        "different" "ways"
##  [7] ","         "up"        "and"       "down"      ";"         "left"
## [ ... and 3 more ]
##
## text2 :
## [1] "@kenbenoit"                     "working"
## [3] ":"                              "on"
## [5] "#quanteda"                      "2day"
## [7] "4ever"                          ","
## [9] "http://textasdata.com?page=123."
```

```
tokens(txt, remove_numbers = FALSE, remove_punct = FALSE)
```

```
## Tokens consisting of 2 documents.
## text1 :
##  [1] "This"      "is"        "$"         "10"        "in"        "999"
##  [7] "different" "ways"      ","         "up"        "and"       "down"
## [ ... and 5 more ]
##
## text2 :
## [1] "@kenbenoit"                     "working"
## [3] ":"                              "on"
## [5] "#quanteda"                      "2day"
## [7] "4ever"                          ","
## [9] "http://textasdata.com?page=123."
```

```
tokens(txt, remove_numbers = FALSE, remove_punct = FALSE, remove_separators = FALSE)
```

```
## Tokens consisting of 2 documents.
## text1 :
##  [1] "This"      " "         "is"        " "         "$"         "10"
##  [7] " "         "in"        " "         "999"       " "         "different"
## [ ... and 18 more ]
##
## text2 :
##  [1] "@kenbenoit" " "          "working"    ":"          " "
##  [6] "on"         " "          "#quanteda"  " "          "2day"
## [11] "\t"         "4ever"
## [ ... and 3 more ]
```

We also have the option to tokenize characters:

```
tokens("Great website: http://textasdata.com?page=123.", what = "character")
```

```
## Tokens consisting of 1 document.
## text1 :
##  [1] "G" "r" "e" "a" "t" "w" "e" "b" "s" "i" "t" "e"
## [ ... and 32 more ]
```

```
tokens("Great website: http://textasdata.com?page=123.", what = "character", remove_separators = FALSE)
```

```
## Tokens consisting of 1 document.
## text1 :
##  [1] "G" "r" "e" "a" "t" " " "w" "e" "b" "s" "i" "t"
## [ ... and 34 more ]
```

and sentences:

```
# sentence level
tokens(c("Kurt Vongeut said; only assholes use semi-colons.", "Today is Thursday in Canberra:  It is yesterday in Lond
    "En el caso de que no puedas ir con ellos, ¿quieres ir con nosotros?"), what = "sentence")
```

```
## Tokens consisting of 3 documents.
## text1 :
## [1] "Kurt Vongeut said; only assholes use semi-colons."
##
## text2 :
## [1] "Today is Thursday in Canberra:  It is yesterday in London."
##
## text3 :
## [1] "En el caso de que no puedas ir con ellos, ¿quieres ir con nosotros?"
```

With `tokens_compound()`, we can concatenate multi-word expressions and keep them as a single feature in subsequent analyses:

```
tokens("New York City is located in the United States.") %>% tokens_compound(pattern = phrase(c("New York City",
    "United States")))
```

```
## Tokens consisting of 1 document.
## text1 :
## [1] "New_York_City" "is"            "located"       "in"
## [5] "the"           "United_States" "."
```

Constructing a document-feature matrix

Tokenizing texts is an intermediate option, and most users will want to skip straight to constructing a document-feature

matrix. For this, we have a Swiss-army knife function, called `dfm()`, which performs tokenization and tabulates the extracted features into a matrix of documents by features. Unlike the conservative approach taken by `tokens()`, the `dfm()` function applies certain options by default, such as `tolower()` – a separate function for lower-casing texts – and removes punctuation. All of the options to `tokens()` can be passed to `dfm()`, however.

```
corp_inaug_post1990 <- corpus_subset(data_corpus_inaugural, Year > 1990)

# make a dfm
dfmat_inaug_post1990 <- tokens(corp_inaug_post1990) %>% dfm()
dfmat_inaug_post1990[, 1:5]
```

```
## Document-feature matrix of: 8 documents, 5 features (0.00% sparse) and 4 docvars.
##               features
## docs           my fellow citizens   , today
##   1993-Clinton  7      5        2 139    10
##   1997-Clinton  6      7        7 131     5
##   2001-Bush     3      1        9 110     2
##   2005-Bush     2      3        6 120     3
##   2009-Obama    2      1        1 130     6
##   2013-Obama    3      3        6  99     4
## [ reached max_ndoc ... 2 more documents ]
```

Other options for a `dfm()` include removing stopwords, and stemming the tokens.

```
# make a dfm, removing stopwords and applying stemming
dfmat_inaug_post1990 <- dfm(dfmat_inaug_post1990, remove = stopwords("english"),
    stem = TRUE, remove_punct = TRUE)
```

```
## Warning: remove_punct argument is not used.
```

```
## Warning: 'remove' is deprecated; use dfm_remove() instead
```

```
## Warning: 'stem' is deprecated; use dfm_wordstem() instead
```

```
dfmat_inaug_post1990[, 1:5]
```

```
## Document-feature matrix of: 8 documents, 5 features (2.50% sparse) and 4 docvars.
##               features
## docs           fellow citizen   , today celebr
##   1993-Clinton      5       2 139    10      4
##   1997-Clinton      7       8 131     6      1
##   2001-Bush         1      10 110     2      0
##   2005-Bush         3       7 120     3      2
##   2009-Obama        1       1 130     6      2
##   2013-Obama        3       8  99     6      1
## [ reached max_ndoc ... 2 more documents ]
```

The option `remove` provides a list of tokens to be ignored. Most users will supply a list of pre-defined "stop words", defined for numerous languages, accessed through the `stopwords()` function:

```
head(stopwords("en"), 20)
```

```
##  [1] "i"          "me"         "my"         "myself"     "we"
##  [6] "our"        "ours"       "ourselves"  "you"        "your"
## [11] "yours"      "yourself"   "yourselves" "he"         "him"
## [16] "his"        "himself"    "she"        "her"        "hers"
```

```
head(stopwords("ru"), 10)
```

```
##  [1] "\u0438"             "\u0432"             "\u0432\u043e"
##  [4] "\u043d\u0435"       "\u0447\u0442\u043e" "\u043e\u043d"
##  [7] "\u043d\u0430"       "\u044f"             "\u0441"
## [10] "\u0441\u043e"
```

```
head(stopwords("ar", source = "misc"), 10)
```

```
##  [1] "\u0641\u0649"       "\u0641\u064a"       "\u0643\u0644"
##  [4] "\u0644\u0645"       "\u0644\u0646"       "\u0644\u0647"
##  [7] "\u0645\u0646"       "\u0647\u0648"       "\u0647\u064a"
## [10] "\u0642\u0648\u0629"
```

Viewing the document-feature matrix

The dfm can be inspected in the Environment pane in RStudio, or by calling R's `View()` function. Calling `textplot_wordcloud()` on a dfm will display a wordcloud.

```
dfmat_uk <- tokens(data_char_ukimmig2010, remove_punct = TRUE) %>% tokens_remove(stopwords("en")) %>%
    dfm()
dfmat_uk
```

```
## Document-feature matrix of: 9 documents, 1,551 features (83.81% sparse) and 0 docvars.
##               features
## docs           immigration unparalleled crisis bnp can solve current birth
##   BNP                   21            1      2  13   1     2       4     4
##   Coalition              6            0      0   0   0     0       1     0
##   Conservative           3            0      0   0   2     0       0     0
##   Greens                 8            0      0   0   1     0       0     0
##   Labour                13            0      0   0   1     0       0     0
##   LibDem                 5            0      0   0   2     0       0     0
##               features
## docs           rates indigenous
##   BNP              2          5
##   Coalition        0          0
##   Conservative     0          0
##   Greens           0          0
##   Labour           0          0
##   LibDem           0          0
## [ reached max_ndoc ... 3 more documents, reached max_nfeat ... 1,541 more features ]
```

To access a list of the most frequently occurring features, we can use `topfeatures()`:

```
topfeatures(dfmat_uk, 20)  # 20 most frequent words
```

```
## immigration     british      people      asylum     britain          uk
##          66          37          35          29          28          27
##      system  population     country         new  immigrants      ensure
##          27          21          20          19          17          17
##       shall citizenship      social    national         bnp     illegal
##          17          16          14          14          13          13
##        work     percent
##          13          12
```

Plotting a word cloud is done using `textplot_wordcloud()`, for a `dfm` class object. This function passes arguments through to `wordcloud()` from the **wordcloud** package, and can prettify the plot using the same arguments:

```
set.seed(100)
library("quanteda.textplots")
textplot_wordcloud(dfmat_uk, min_count = 6, random_order = FALSE, rotation = 0.25,
    color = RColorBrewer::brewer.pal(8, "Dark2"))
```

Grouping documents by document variable

Often, we are interested in analysing how texts differ according to substantive factors which may be encoded in the document variables, rather than simply by the boundaries of the document files. We can group documents which share the same value for a document variable when creating a dfm:

```
dfmat_pres <- tail(data_corpus_inaugural, 20) %>% tokens(remove_punct = TRUE) %>%
    tokens_remove(stopwords("en")) %>% dfm() %>% dfm_group(groups = Party)
```

We can sort this dfm, and inspect it:

```
dfm_sort(dfmat_pres)
```

```
## Document-feature matrix of: 2 documents, 4,373 features (32.22% sparse) and 1 docvar.
##             features
## docs          us world can people must new america nation freedom time
##   Democratic 149    89  96     80   93  87      65     73      37   52
##   Republican 140   107  84     89   68  66      83     62      84   58
## [ reached max_nfeat ... 4,363 more features ]
```

Grouping words by dictionary or equivalence class

For some applications we have prior knowledge of sets of words that are indicative of traits we would like to measure from the text. For example, a general list of positive words might indicate positive sentiment in a movie review, or we might have a dictionary of political terms which are associated with a particular ideological stance. In these cases, it is sometimes useful to treat these groups of words as equivalent for the purposes of analysis, and sum their counts into classes.

For example, let's look at how words associated with terrorism and words associated with the economy vary by President in the inaugural speeches corpus. From the original corpus, we select Presidents since Clinton:

```
corp_inaug_post1991 <- corpus_subset(data_corpus_inaugural, Year > 1991)
```

Now we define a demonstration dictionary:

```
dict <- dictionary(list(terror = c("terrorism", "terrorists", "threat"), economy = c("jobs",
    "business", "grow", "work")))
```

We can use the dictionary when making the dfm:

```
dfmat_inaug_post1991_dict <- tokens(corp_inaug_post1991) %>% tokens_lookup(dictionary = dict) %>%
    dfm()
dfmat_inaug_post1991_dict
```

```
## Document-feature matrix of: 8 documents, 2 features (12.50% sparse) and 4 docvars.
##               features
## docs           terror economy
##   1993-Clinton      0       8
##   1997-Clinton      1       8
##   2001-Bush         0       4
##   2005-Bush         1       6
##   2009-Obama        1      10
##   2013-Obama        1       6
## [ reached max_ndoc ... 2 more documents ]
```

The constructor function `dictionary()` also works with two common "foreign" dictionary formats: the LIWC and Provalis Research's Wordstat format. For instance, we can load the LIWC and apply this to the Presidential inaugural speech corpus:

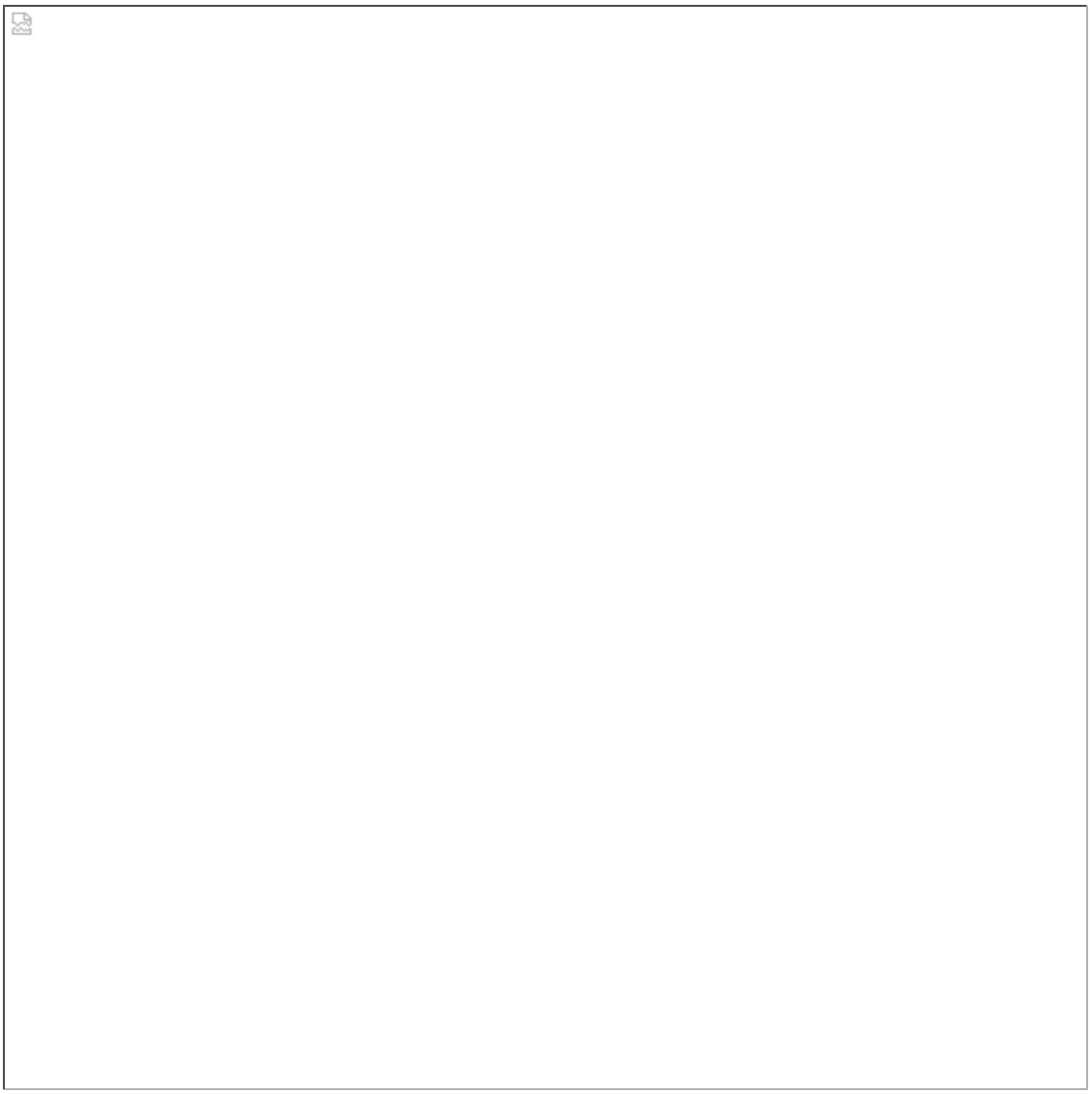
```
dictliwc <- dictionary(file = "LIWC2001_English.dic", format = "LIWC")
dfmat_inaug_subset <- dfm(tokens(data_corpus_inaugural[52:58]), dictionary = dictliwc)
dfmat_inaug_subset[, 1:10]
```

```
## Document-feature matrix of: 7 documents, 10 features (1.43% sparse) and 4 docvars.
##               features
## docs           Pronoun  I  We Self You Other Negate Assent Article Preps
##   1993-Clinton     179 15 124  139  12    12     25      2     115   211
##   1997-Clinton     188  8 134  142   0    27     27      4     194   310
##   2001-Bush        176 15 111  126   8    16     40      2     104   208
##   2005-Bush        171 10  92  102  25    20     25      5     174   307
##   2009-Obama       243  5 156  161  17    34     40      2     185   294
##   2013-Obama       219  7 168  175   5    21     42      1     148   265
## [ reached max_ndoc ... 1 more document ]
```

Further examples

Similarities between texts

```
library("quanteda.textstats")
dfmat_inaug_post1980 <- corpus_subset(data_corpus_inaugural, Year > 1980) %>% tokens(remove_punct = TRUE) %>%
    tokens_wordstem(language = "en") %>% tokens_remove(stopwords("en")) %>% dfm()
tstat_obama <- textstat_simil(dfmat_inaug_post1980, dfmat_inaug_post1980[c("2009-Obama",
    "2013-Obama"), ], margin = "documents", method = "cosine")
as.list(tstat_obama)
dotchart(as.list(tstat_obama)$"2013-Obama", xlab = "Cosine similarity", pch = 19)
```

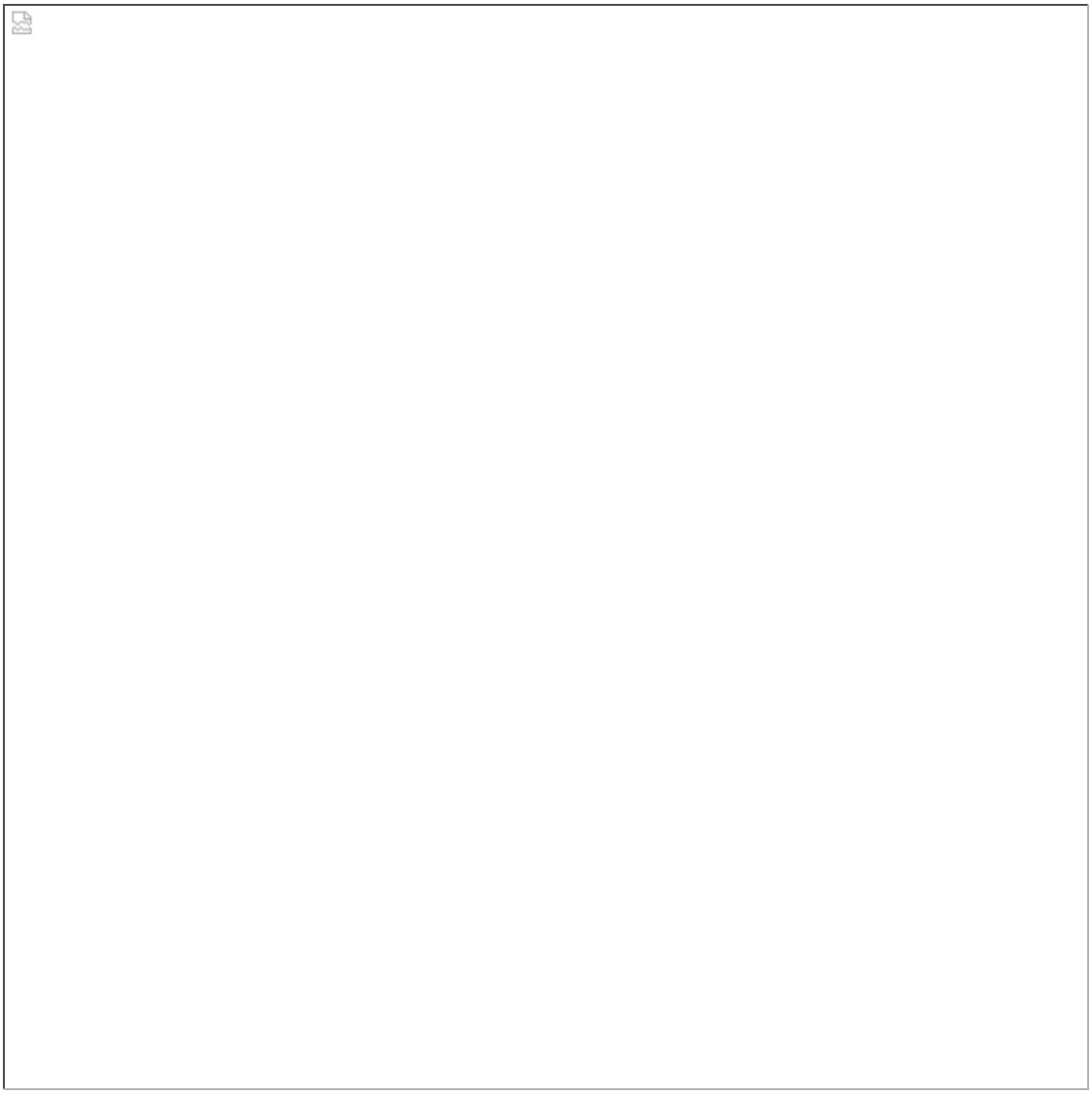


We can use these distances to plot a dendrogram, clustering presidents.
First, load some data.

```
data_corpus_sotu <- readRDS(url("https://quanteda.org/data/data_corpus_sotu.rds"))
dfmat_sotu <- corpus_subset(data_corpus_sotu, Date > as.Date("1980-01-01")) %>% tokens(remove_punct = TRUE) %>%
    tokens_wordstem(language = "en") %>% tokens_remove(stopwords("en")) %>% dfm()
dfmat_sotu <- dfm_trim(dfmat_sotu, min_termfreq = 5, min_docfreq = 3)
```

Now we compute clusters and plot the dendrogram:

```
# hierarchical clustering - get distances on normalized dfm
tstat_dist <- textstat_dist(dfm_weight(dfmat_sotu, scheme = "prop"))
# hiarchical clustering the distance object
pres_cluster <- hclust(as.dist(tstat_dist))
# label with document names
pres_cluster$labels <- docnames(dfmat_sotu)
# plot as a dendrogram
plot(pres_cluster, xlab = "", sub = "", main = "Euclidean Distance on Normalized Token Frequency")
```



We can also look at term similarities:

```
tstat_sim <- textstat_simil(dfmat_sotu, dfmat_sotu[, c("fair", "health", "terror")],
    method = "cosine", margin = "features")
lapply(as.list(tstat_sim), head, 10)
```

```
## $fair
##      time    better       far  strategi        us     lower      long       one   practic      onli
## 0.8266617 0.8135324 0.8036487 0.8002557 0.8000581 0.7995066 0.7977770 0.7949795 0.7944127 0.7899963
##
## $health
##    system      issu    privat      need    expand    reform   support      hous    dramat      mani
## 0.9232094 0.9229859 0.9175231 0.9145142 0.9118901 0.9072380 0.9072374 0.9063870 0.9051588 0.9045851
##
## $terror
## terrorist    coalit    cheney      evil  homeland   liberti      11th    sudden     regim   septemb
## 0.8539894 0.8179609 0.8175618 0.7949619 0.7878223 0.7697739 0.7603221 0.7556575 0.7533021 0.7502925
```

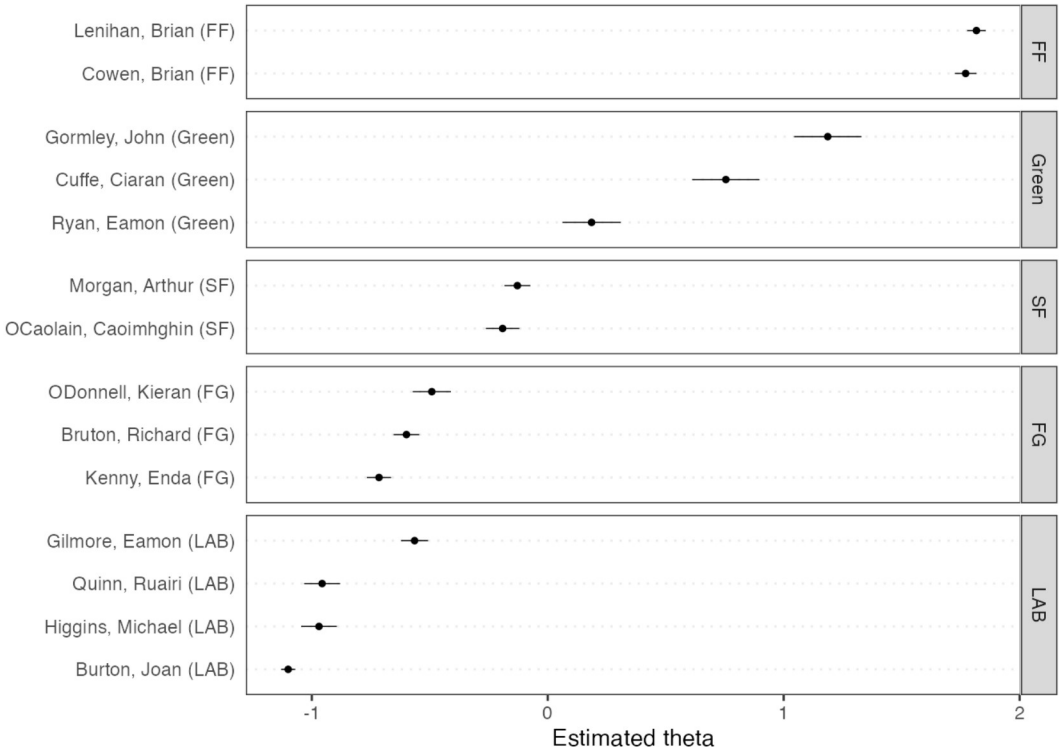
Scaling document positions

Here is a demonstration of unsupervised document scaling comparing the “Wordfish” model:

```
if (require("quanteda.textmodels")) {
    dfmat_ire <- dfm(tokens(data_corpus_irishbudget2010))
    tmod_wf <- textmodel_wordfish(dfmat_ire, dir = c(2, 1))

    # plot the Wordfish estimates by party
    textplot_scale1d(tmod_wf, groups = docvars(dfmat_ire, "party"))
}
```

```
## Loading required package: quanteda.textmodels
```



Topic models

quanteda makes it very easy to fit topic models as well, e.g.:

```
quant_dfm <- tokens(data_corpus_irishbudget2010, remove_punct = TRUE, remove_numbers = TRUE) %>%
    tokens_remove(stopwords("en")) %>% dfm()
quant_dfm <- dfm_trim(quant_dfm, min_termfreq = 4, max_docfreq = 10)
quant_dfm
```

```
## Document-feature matrix of: 14 documents, 1,263 features (64.52% sparse) and 6 docvars.
##                       features
## docs                   supplementary april said period severe today report
##   Lenihan, Brian (FF)              7     1    1      2      3     9      6
##   Bruton, Richard (FG)             0     1    0      0      0     6      5
##   Burton, Joan (LAB)               0     0    4      2      0    13      1
##   Morgan, Arthur (SF)              1     3    0      3      0     4      0
##   Cowen, Brian (FF)                0     0    0      4      1     3      2
##   Kenny, Enda (FG)                 1     4    4      1      0     2      0
##                       features
## docs                   difficulties months road
##   Lenihan, Brian (FF)             6     11    2
##   Bruton, Richard (FG)            0      0    1
##   Burton, Joan (LAB)              1      3    1
##   Morgan, Arthur (SF)             1      4    2
##   Cowen, Brian (FF)               1      3    2
##   Kenny, Enda (FG)                0      2    5
## [ reached max_ndoc ... 8 more documents, reached max_nfeat ... 1,253 more features ]
```

Now we can fit the topic model and plot it:

```
set.seed(100)
if (require("stm")) {
    my_lda_fit20 <- stm(quant_dfm, K = 20, verbose = FALSE)
    plot(my_lda_fit20)
}
```

```
## Loading required package: stm
```

```
## stm v1.3.6 successfully loaded. See ?stm for help.
##  Papers, resources, and other materials at structuraltopicmodel.com
```