CA_Emb_Clus

2023-11-01

```r
#Install and load necessary packages
packages <- c("here","tidyverse","dplyr","readxl","umap","dbscan","fpc","Rtsne","glmnet")
for (package in packages) {
  if (!requireNamespace(package, quietly = TRUE)) {
    install.packages(package)
  }
}
lapply(packages,library, character.only=T)
```

```
## here() starts at F:/Github/Embeddings_Voting

## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.3     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.4.3     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.0
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
##
## Attache Paket: 'dbscan'
##
##
## Das folgende Objekt ist maskiert 'package:stats':
##
##     as.dendrogram
##
##
##
## Attache Paket: 'fpc'
##
##
## Das folgende Objekt ist maskiert 'package:dbscan':
##
##     dbscan
##
##
## Lade nötiges Paket: Matrix
##
##
## Attache Paket: 'Matrix'
##
```

```
##
## Die folgenden Objekte sind maskiert von 'package:tidyr':
##
##     expand, pack, unpack
##
##
## Loaded glmnet 4.1-8
```

```
## [[1]]
## [1] "here"      "stats"     "graphics"  "grDevices" "utils"     "datasets"
## [7] "methods"   "base"
##
## [[2]]
##  [1] "lubridate" "forcats"   "stringr"   "dplyr"     "purrr"     "readr"
##  [7] "tidyr"     "tibble"    "ggplot2"   "tidyverse" "here"      "stats"
## [13] "graphics"  "grDevices" "utils"     "datasets"  "methods"   "base"
##
## [[3]]
##  [1] "lubridate" "forcats"   "stringr"   "dplyr"     "purrr"     "readr"
##  [7] "tidyr"     "tibble"    "ggplot2"   "tidyverse" "here"      "stats"
## [13] "graphics"  "grDevices" "utils"     "datasets"  "methods"   "base"
##
## [[4]]
##  [1] "readxl"    "lubridate" "forcats"   "stringr"   "dplyr"     "purrr"
##  [7] "readr"     "tidyr"     "tibble"    "ggplot2"   "tidyverse" "here"
## [13] "stats"     "graphics"  "grDevices" "utils"     "datasets"  "methods"
## [19] "base"
##
## [[5]]
##  [1] "umap"      "readxl"    "lubridate" "forcats"   "stringr"   "dplyr"
##  [7] "purrr"     "readr"     "tidyr"     "tibble"    "ggplot2"   "tidyverse"
## [13] "here"      "stats"     "graphics"  "grDevices" "utils"     "datasets"
## [19] "methods"   "base"
##
## [[6]]
##  [1] "dbscan"    "umap"      "readxl"    "lubridate" "forcats"   "stringr"
##  [7] "dplyr"     "purrr"     "readr"     "tidyr"     "tibble"    "ggplot2"
## [13] "tidyverse" "here"      "stats"     "graphics"  "grDevices" "utils"
## [19] "datasets"  "methods"   "base"
##
## [[7]]
##  [1] "fpc"       "dbscan"    "umap"      "readxl"    "lubridate" "forcats"
##  [7] "stringr"   "dplyr"     "purrr"     "readr"     "tidyr"     "tibble"
## [13] "ggplot2"   "tidyverse" "here"      "stats"     "graphics"  "grDevices"
## [19] "utils"     "datasets"  "methods"   "base"
##
## [[8]]
##  [1] "Rtsne"     "fpc"       "dbscan"    "umap"      "readxl"    "lubridate"
##  [7] "forcats"   "stringr"   "dplyr"     "purrr"     "readr"     "tidyr"
## [13] "tibble"    "ggplot2"   "tidyverse" "here"      "stats"     "graphics"
## [19] "grDevices" "utils"     "datasets"  "methods"   "base"
##
## [[9]]
##  [1] "glmnet"    "Matrix"    "Rtsne"     "fpc"       "dbscan"    "umap"
```

```
##  [7] "readxl"    "lubridate" "forcats"   "stringr"   "dplyr"     "purrr"
## [13] "readr"     "tidyr"     "tibble"    "ggplot2"   "tidyverse" "here"
## [19] "stats"     "graphics"  "grDevices" "utils"     "datasets"  "methods"
## [25] "base"
```

Reading in the data

```
#Read in the datasets "Embeddings_text", "features", & wordEmbeddings and merge them
sentences <- read.csv(here("data","Embeddings_text.csv"))
structure <- read_excel(here("data","wordEmbeddings.xlsx"))
```

```
## New names:
## * `` -> `...1`
```

```
embeddings <- read.csv(here("data","features.csv"))
embeddings2 <- read.csv(here("data","features2.csv"))
embeddings_word <- read.csv(here("data","features_word.csv"))

# Modify the structure dataframe
structure <- structure %>%
  mutate(sentence = sentences$word.comment) %>%
  select(-`word+comment`)

# Combine structure and embeddings dataframes
climateact <- cbind(structure, select(embeddings2,-1))
climateact_word <- cbind(structure, select(embeddings_word,-1))

# Import the new CSV file
additional_data <- read.csv(here("data","all_surveys.csv"))

# Left join on the 'personID' column of climateact with the 'participantID' column of additional_data
climateact <- left_join(climateact,
                        select(additional_data, participantID, intendedVote, ratingLaw, mean_valence_ma
                        by = c("personID" = "participantID"))

climateact_word <- left_join(climateact,
                        select(additional_data, participantID, intendedVote, ratingLaw, mean_valence_ma
                        by = c("personID" = "participantID"))

# Rearrange the columns to place the new columns at positions 11-13
cols <- c(1:10, (ncol(climateact)-2):ncol(climateact), 11:(ncol(climateact)-3))
climateact <- climateact[, cols]

climateact_word <- climateact_word[, cols]

# Check the first few rows of the merged data to ensure correctness
head(climateact)
```

```
##   ...1                            personID wave            group
## 1    1 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 2    2 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 3    3 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 4    4 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
```

```
## 5    5 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 6    6 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
##                                  wordID                         word valence
## 1 ea6df036-7343-48ee-9e3c-98a26623001e                  Klimagesetz      -3
## 2 b73473bb-de71-47c2-a1f4-9e178450d70a                        Teuer      -2
## 3 debed5f6-70f7-429b-b366-d59af20cab4e                Stromteuerung      -2
## 4 8aa877cd-395d-453d-9d29-e87a0d23be01 Hohe Kosten  Stromleitungen      -2
## 5 a3aa6fa7-1e58-4342-be99-0c1c69ceea0b             PV privat Unsinn      -2
## 6 88c1a997-d441-4820-a3f0-1bfc04d44e12         Wirkung global Null       2
##                                                    firstOrder comment
## 1  Stromteuerung ## PV privat Unsinn ## Wirkung global Null    <NA>
## 2 Hohe Kosten  Stromleitungen ## Mangellage Winter ungelöst    <NA>
## 3                Klimagesetz ## Hohe Kosten  Stromleitungen    <NA>
## 4                                  Teuer ## Stromteuerung    <NA>
## 5                 Klimagesetz ## Mangellage Winter ungelöst    <NA>
## 6                     Klimagesetz ## Technologien fördern !    <NA>
##                     sentence intendedVote ratingLaw mean_valence_macro
## 1                 Klimagesetz            0         1             -1.125
## 2                       Teuer            0         1             -1.125
## 3                Stromteuerung            0         1             -1.125
## 4 Hohe Kosten  Stromleitungen            0         1             -1.125
## 5            PV privat Unsinn            0         1             -1.125
## 6         Wirkung global Null            0         1             -1.125
##            X0         X1          X2         X3        X4          X5
## 1  0.02261609 0.41567880  0.13157149  0.3202330 0.4779559  0.06018003
## 2  0.11673464 0.30732363 -0.06839614 -0.2480668 0.1167039 -0.07126695
## 3 -0.09475741 0.56212765 -0.04419769  0.2923742 0.3247700 -0.19319071
## 4 -0.09993468 0.26121920  0.10122752  0.1628261 0.1066939 -0.24150708
## 5  0.06135034 0.27195835 -0.09215593 -0.2275685 0.2001318 -0.26117945
## 6 -0.34348840 0.07295866 -0.05184497 -0.1044376 0.1155727 -0.24980439
##            X6         X7          X8          X9         X10         X11
## 1  0.02622875 -0.1372136 -0.03204702  0.34285630 -0.19240779 -0.47685114
## 2  0.34281245  0.5160920  0.17544468 -0.01867275  0.15530382 -0.10073654
## 3  0.24289179  0.2777272  0.01902590  0.09324283 -0.08472029 -0.03714182
## 4  0.14384507  0.2506189  0.03405216 -0.02476181  0.01331178  0.02768885
## 5 -0.03734094  0.3461760  0.02038925  0.11345073  0.28338066  0.10042357
## 6  0.03101562  0.4375031 -0.15477693  0.41885373  0.08501530 -0.36997896
##           X12         X13         X14         X15         X16        X17
## 1 -0.017735418 -0.04940423 -0.01423884  0.05539362 -0.21794201 -0.2155607
## 2  0.101379775 -0.19449480 -0.04100733 -0.16848433  0.11261106  0.2488487
## 3  0.002967140 -0.20247406 -0.21098532  0.28277305 -0.01656694  0.1876836
## 4  0.001675247 -0.06422734 -0.20862868  0.36352074  0.08941129  0.1274105
## 5  0.314642880 -0.04545225  0.01339511  0.09173759  0.05667191  0.1238906
## 6  0.124764204  0.26400763 -0.23645282  0.13886662 -0.14850238 -0.1038428
##           X18         X19        X20         X21          X22         X23
## 1 -0.02849606 -0.09328964 0.27199230  0.27904817 -0.144245540  0.11836611
## 2  0.13379698 -0.15420641 0.09610786  0.01248386  0.052945547 -0.07483935
## 3  0.07097083 -0.24048527 0.60103595 -0.28809088 -0.074692465 -0.21078518
## 4 -0.12667732 -0.09415310 0.13523746 -0.26643413  0.002162269 -0.14335620
## 5  0.11725038  0.42703325 0.24013029 -0.46909866 -0.035167010 -0.23104742
## 6 -0.24256808  0.01773300 0.22207978 -0.29998168 -0.031697540  0.13117085
##           X24         X25         X26          X27         X28         X29
## 1 -0.031293597 -0.10157197 -0.31222078 -0.052827336 -0.10898636  0.05909189
## 2 -0.013049739 -0.24674174 -0.19754483 -0.051803720  0.09992157 -0.44714794
```

```
## 3  0.001423934  0.05746386  0.07263113 -0.003051654 -0.18861936 -0.53515637
## 4  0.051393770  0.24920171  0.17521483  0.157853650 -0.13939363 -0.28144740
## 5 -0.013242474 -0.05420180  0.17718163 -0.005424962 -0.30387446 -0.23520833
## 6  0.285286660  0.22772983 -0.35720918 -0.174074650  0.11661161 -0.14467879
##           X30          X31         X32         X33         X34        X35
## 1  0.09113851 -0.024481092  0.03568596 0.03692838  0.23499915 0.1965462
## 2  0.03237359 -0.167846140 -0.08676649 0.12442964 -0.04454695 0.3838497
## 3 -0.09199998 -0.024737718  0.06257919 0.31325630  0.19448473 0.3207063
## 4 -0.12388845 -0.105317460  0.05637392 0.11877028 -0.05466450 0.2952493
## 5  0.06894141 -0.267906220 -0.22123809 0.33757186  0.15954068 0.3585013
## 6 -0.14486378 -0.009222079  0.12243079 0.04758515  0.22678880 0.3662645
##           X36         X37         X38          X39         X40         X41
## 1  0.24942935 -0.19286329 -0.21103084  0.282401100  0.05464749 -0.20058784
## 2 -0.12261450  0.05182374 -0.01613143  0.000815781  0.04964673 -0.09202080
## 3  0.27342230  0.12402918  0.19043050  0.092332780  0.16009766 -0.36174858
## 4  0.35327482  0.03639930  0.11481265  0.059066810  0.17742772 -0.04379446
## 5  0.22884113 -0.14950807 -0.19346915 -0.188837440  0.16779454 -0.45333028
## 6 -0.01795094  0.10310605 -0.41067964  0.162330390 -0.07511289  0.17571895
##           X42         X43          X44          X45         X46          X47
## 1  0.30684853  0.32606420  0.002487744  0.261954840 0.11445024 -0.28538978
## 2 -0.04898478  0.26648710  0.013457343 -0.004464989 0.03895296  0.04595191
## 3 -0.03975003  0.12713142 -0.037617090  0.154113810 0.21541070 -0.49815205
## 4 -0.43422407 -0.09255642 -0.142312330 -0.030230230 0.20946140 -0.45659128
## 5  0.06324089  0.15518485  0.059320915  0.272178920 0.09909050 -0.19242679
## 6  0.19114617  0.31493440  0.118282300  0.115549220 0.13426967 -0.17650893
##           X48         X49         X50         X51           X52         X53
## 1 -0.05714510  0.08293119 -0.08387188 -0.22035404 -3.595690e-01 -0.10147698
## 2 -0.34204876  0.16887441  0.09101259 -0.01707159 -1.248284e-02  0.07121288
## 3 -0.07969356 -0.20661755  0.57150930  0.10445198 -1.645932e-01 -0.01992646
## 4  0.03745114 -0.11996632  0.43207080  0.37231657 -2.360882e-05  0.09702335
## 5  0.13413470 -0.38620988  0.25267850 -0.06418447 -6.003303e-02 -0.08086141
## 6 -0.16030437 -0.31614810  0.15366104  0.21761297 -1.135696e-01 -0.21328756
##           X54         X55         X56         X57         X58         X59
## 1 -0.24119572  0.04545888  0.14886174 -0.03612012 -0.04343227 -0.57752100
## 2  0.14703867  0.22788726  0.01723466  0.22426940  0.07862089 -0.05635640
## 3  0.19111022 -0.05038616  0.19886590 -0.09438688  0.48041190 -0.41292235
## 4 -0.02336122 -0.33649862  0.13122399 -0.03739687  0.35045594  0.01400799
## 5 -0.22903545  0.04894703  0.28605476  0.13601086  0.16325001 -0.21457338
## 6  0.02243698 -0.01215132 -0.26649547 -0.38620076 -0.42856503 -0.46744037
##            X60         X61        X62        X63        X64         X65
## 1 -0.264166270 -0.02009833 -1.1681505 0.06969843  0.1696003 -0.07117768
## 2  0.125102460 -0.03296541 -1.3464280 0.38523632 -0.2585847 -0.04047498
## 3  0.006867779  0.13804646 -0.2332195 0.27708378 -0.2523540 -0.03680314
## 4 -0.336306200  0.12349646 -0.3640960 0.07938382 -0.2388077 -0.07389593
## 5 -0.088128015 -0.08198283 -0.4612989 0.17990208 -0.1491646  0.13957387
## 6 -0.202797890 -0.15155788 -0.7621882 0.07264986  0.4900653  0.03395813
##           X66         X67         X68         X69         X70         X71
## 1 -0.07239136  0.06761839  0.22860266 0.06079763 -0.05651608  0.28151214
## 2 -0.12089296  0.08686645 -0.06015658 0.35924700  0.05906856 -0.11939020
## 3 -0.02689623  0.01640584  0.02708583 0.16415090  0.13204518 -0.14695013
## 4  0.08858283  0.11665335 -0.07163857 0.08244424 -0.10863674 -0.08490578
## 5  0.15368890  0.03494622  0.00328467 0.17642505 -0.04796543  0.08835253
## 6 -0.02727154 -0.34995790 -0.01149069 0.18494277 -0.06238855 -0.09688488
##           X72         X73         X74          X75         X76        X77
```

```
## 1 -0.024670647 -0.20780876 -0.08054124  0.012136006  0.35863823 0.4180733
## 2  0.058090030  0.30339453  0.08014541 -0.111489150 -0.01244491 0.3292792
## 3  0.021261055 -0.16217732 -0.15235294 -0.110418100 -0.11313064 0.4613398
## 4 -0.044725537 -0.08342224 -0.19510044  0.238595650 -0.05326193 0.3021275
## 5 -0.253902970  0.04100412 -0.05606092  0.009424857  0.05949497 0.3630943
## 6 -0.006438684 -0.08809965  0.21353897 -0.143775020  0.14862294 0.2815050
##           X78         X79        X80         X81         X82         X83
## 1  0.27518070 -0.18639407 0.03621901 -0.09677085 -0.05780701 -0.02967132
## 2 -0.22308573 -0.08765344 0.16574177  0.05570852 -0.08670637 -0.22551684
## 3 -0.04181961 -0.24502316 0.25645727 -0.05899211 -0.30337995 -0.02076655
## 4  0.10962679 -0.22880477 0.17940627 -0.16424206 -0.36757007  0.15254202
## 5  0.27772093 -0.25224856 0.54992384  0.38994595 -0.26484123  0.08329200
## 6  0.34761897  0.29598004 0.28941658 -0.06638970  0.24752475 -0.11612035
##           X84         X85         X86         X87        X88         X89
## 1 -0.05591200 -0.11392505  0.42185688 -0.14972503 0.41028306  0.04735265
## 2 -0.16755603  0.22431758 -0.09933285  0.01252485 0.12054226 -0.05449719
## 3  0.06108426  0.44503304  0.30392197 -0.08747853 0.22897494  0.06428216
## 4  0.04605288  0.17331250  0.44446170 -0.07600475 0.08054793 -0.26786770
## 5 -0.26013392  0.26287064  0.13388382 -0.28307834 0.05239553 -0.41324340
## 6 -0.09380734 -0.08587175  0.28630130 -0.28828454 0.17306514 -0.27693778
##           X90          X91          X92           X93        X94        X95
## 1  0.15988353 -0.041171953  0.420263380 -2.003800e-01 0.01449173  0.3301413
## 2  0.30134922 -0.188481660  0.288723980 -4.485671e-02 0.23899221  0.1242628
## 3  0.20939632  0.155975090  0.123546820 -3.279490e-02 0.25015050 -0.1711615
## 4  0.37566766  0.171494960  0.123473026 -7.320157e-02 0.17332780  0.2639253
## 5 -0.07408339  0.008258324 -0.008781432  7.305174e-05 0.29026723 -0.2341570
## 6  0.02707455  0.174918430  0.098890886  8.100611e-02 0.03303280  0.1404468
##          X96         X97        X98      X99        X100        X101
## 1  0.1789841 -0.10738464 0.26415864 1.520391 -0.12734832 -0.03562856
## 2  0.1999191 -0.07634799 0.15834163 1.957760 -0.01778265  0.10021588
## 3 -0.2108436 -0.55675250 0.17671376 2.413126 -0.07501025  0.02730165
## 4 -0.1773120 -0.28523560 0.02451988 1.022113 -0.04145790  0.07408847
## 5 -0.2636065 -0.40006036 0.06786461 1.321589 -0.08544987  0.17517476
## 6  0.2743015  0.02632959 0.01739252 1.401766  0.28481087  0.20659359
##           X102        X103        X104        X105       X106        X107
## 1 -0.260461630  0.43391022  0.07947432 -0.23145650 0.24440816  0.04043056
## 2 -0.030718544  0.15720217 -0.08931929 -0.14037964 0.10058472 -0.05728476
## 3 -0.007698914  0.25152820 -0.08058914 -0.12650347 0.00165032  0.23292597
## 4 -0.010172198  0.15488602 -0.18808344  0.01945245 0.01252361  0.36699307
## 5 -0.149075240 -0.02094668  0.02780969 -0.06996036 0.32159394  0.47844600
## 6 -0.290088700 -0.08990430 -0.23883103  0.08746920 0.05257041  0.13858880
##           X108       X109        X110        X111         X112        X113
## 1  0.300014380 -0.2347584 -0.18578328 -0.06113918 -0.066009810 -0.18043081
## 2 -0.043421734  0.1440315 -0.23529367  0.05729066 -0.090580060 -0.22782670
## 3 -0.021570360 -0.3192053  0.18338658 -0.03683810 -0.129730370 -0.02150692
## 4  0.008872049 -0.4041843  0.07049349 -0.24874832 -0.043328680  0.13202840
## 5  0.208186460 -0.1637248 -0.20932582  0.10092684 -0.201424420 -0.11077157
## 6  0.036945330  0.1498832  0.12326211 -0.12061304 -0.002387389  0.14473943
##          X114         X115        X116       X117        X118         X119
## 1  0.08110253 -0.121727390  0.14496079  0.2272206 -0.08536288  0.038887240
## 2  0.08921979 -0.005500472 -0.14407608  0.1014702  0.15759039  0.238479300
## 3  0.31901400 -0.108669420  0.03028820 -0.1297392  0.19473177  0.230518310
## 4  0.23932773 -0.018176574 -0.19296382 -0.1077768  0.18487175  0.003007852
## 5  0.19480062 -0.069643900 -0.12483952  0.4015840  0.08765770 -0.132033960
```

```
## 6 -0.33996367 -0.197824020  0.07439195  0.2572827  0.10913359  0.232203100
##           X120        X121        X122         X123        X124        X125
## 1 -0.404084400 -0.25195068  0.03452230 -0.036925886  0.09061310 -0.48035932
## 2 -0.083462500  0.07791138 -0.09407581  0.038590685 -0.09591089 -0.60188633
## 3 -0.163613780  0.22674185 -0.02685359 -0.007040927  0.27778235 -0.62161700
## 4 -0.322981660  0.17901565  0.10386873  0.218015220  0.17469980 -0.38143450
## 5 -0.097742600  0.04722916  0.24149841 -0.126709970  0.01571999 -0.50445500
## 6  0.001346793 -0.52718150  0.03269693 -0.011201181 -0.13356619 -0.09322557
##         X126        X127        X128        X129        X130        X131
## 1 0.33395922 -0.06818706  0.22271234 -0.22898622  0.07355142  0.11846305
## 2 0.28803504  0.21142730 -0.14504126  0.08128538  0.17951448  0.22311194
## 3 0.32719022  0.27244523 -0.28196192  0.01128709 -0.12122413 -0.01457459
## 4 0.22565706  0.35564520 -0.01824545 -0.00788381 -0.07331645 -0.06476910
## 5 0.20110825  0.37954462 -0.22459844  0.24143665 -0.04022129 -0.10045232
## 6 0.01718577  0.16829845 -0.02362473 -0.21909437  0.14138201 -0.10899671
##          X132      X133        X134        X135        X136        X137
## 1 -0.02385168 0.2006663 -0.21867393 -0.21208340  0.25587913  0.44585013
## 2  0.16190287 0.1320642 -0.11139327 -0.03563640  0.10002566  0.08726547
## 3 -0.09958005 0.1189813 -0.16308033  0.05069763  0.04392216  0.17822865
## 4 -0.09188741 0.1964263 -0.09004974  0.08609492  0.22384925  0.19602327
## 5 -0.17735553 0.1149955  0.22169495  0.26798683 -0.09637214 -0.21297778
## 6 -0.09087955 0.1470817 -0.41388370 -0.04915237  0.31061095  0.21915357
##          X138        X139        X140      X141        X142        X143
## 1 0.002349995  0.29737183  0.09137628 0.2802852  0.12117270  0.07921332
## 2 0.109020830 -0.33334932 -0.39003536 0.2136443 -0.02116551 -0.01598707
## 3 0.379259020  0.21943913 -0.15782902 0.3197749  0.40509227 -0.15402801
## 4 0.067937076  0.26102528 -0.01294356 0.2192316  0.25521650 -0.14872721
## 5 0.359854220  0.04373307  0.03596201 0.3309037  0.35212030  0.13758200
## 6 0.066416650  0.36098626  0.23259918 0.2539387  0.02304904  0.09429134
##           X144        X145        X146        X147        X148         X149
## 1 -0.029304912  0.04640056 -0.16555507  0.01481730 -0.23549990 -0.013860919
## 2 -0.024764067 -0.09172882 -0.18043843 -0.53458416 -0.01483851  0.235814470
## 3  0.172329470 -0.31512254 -0.56042737 -0.01878885  0.03928582  0.009338447
## 4 -0.006528052 -0.15048550 -0.20963861  0.22446784  0.17541814 -0.131201600
## 5  0.046239700  0.07886729  0.13349533 -0.12419848  0.09371684  0.361252370
## 6 -0.067228640  0.13814805  0.07699314  0.21907751  0.08659186 -0.316247200
##         X150        X151         X152        X153        X154        X155
## 1  0.2470664  0.03049158  0.009443624  0.07457122 0.416194230  0.08786263
## 2 -0.1412274  0.02896320 -0.021902407  0.05395132 0.183592830 -0.12045333
## 3  0.2471782  0.05418564  0.115203336 -0.09837905 0.129356830 -0.18641935
## 4  0.3551978 -0.08051868  0.490390720  0.03180928 0.211002420 -0.07634156
## 5  0.6077831  0.16386843  0.219030900 -0.44068515 0.174287600 -0.22170687
## 6  0.2255308  0.23341256 -0.068985130  0.24986550 0.007210231 -0.22009896
##          X156        X157         X158       X159         X160       X161
## 1 -0.03656142 -0.05654274  0.387659880 0.23511134 -0.058851820  0.3595527
## 2  0.12734564 -0.19134301  0.044715036 0.17665274 -0.137908860  0.2534820
## 3  0.06568932 -0.05623423  0.432662220 0.28233775 -0.064131520  0.3056374
## 4  0.11642799  0.03183958  0.315607550 0.01729675  0.150261330  0.2029412
## 5  0.09093915  0.03850016 -0.004594806 0.09812836 -0.007539874  0.0502291
## 6 -0.27064830 -0.14588127  0.237385170 0.13074315  0.094662370 -0.1087397
##         X162        X163        X164       X165        X166        X167
## 1  0.2454160 -0.05186247  0.13887885 -0.1222296 -0.07313665  0.09697939
## 2  0.2047987  0.09132326  0.05893046 -0.1341088  0.05736413  0.04043398
## 3 -0.2178054 -0.06256635 -0.22434630 -0.1920804 -0.20836318  0.03553380
```

```
## 4 -0.1332563 -0.15382968 -0.14428438  0.0778507 -0.15612075 -0.04830385
## 5  0.2016113  0.08711220 -0.19777776 -0.3718700 -0.07135798 -0.26853140
## 6 -0.3136659 -0.19229095  0.02924709  0.3923129  0.06844054  0.09351880
##          X168        X169         X170        X171         X172         X173
## 1  0.48890767  0.04108002  0.254302830 -0.47432145 -0.087799680 -0.322764100
## 2  0.17839870  0.14540565  0.132463720 -0.11750524 -0.109296520 -0.006134426
## 3  0.10103197  0.11519057  0.410390850 -0.09680297  0.254088460 -0.083300250
## 4  0.09625446 -0.34619284 -0.001349966  0.14348702  0.085062500  0.278696900
## 5  0.08198486  0.09303701  0.134906020  0.04700267  0.004854675 -0.052808475
## 6 -0.22081156  0.11562558  0.160196680 -0.36987892  0.053883184 -0.135739360
##          X174         X175         X176       X177        X178        X179
## 1 -0.05979318  0.092390390 -0.115239410 0.24847019 -0.24209880  0.25823748
## 2 -0.05300963  0.005514477 -0.069149640 0.04562229 -0.06718183  0.14632235
## 3  0.06167350 -0.040593100 -0.003851859 0.27870438 -0.47782713  0.22243597
## 4  0.15123238 -0.225183640 -0.194270820 0.22751180 -0.48580750  0.18973902
## 5  0.18065323 -0.342552450 -0.360442100 0.13205208 -0.44722226  0.06634392
## 6  0.40999818 -0.082599506 -0.217404100 0.21312930  0.02740563 -0.35850123
##          X180        X181       X182        X183        X184        X185
## 1 -0.12012038 -0.16850738 0.04191121  0.11273575  0.12773839  0.07525615
## 2  0.08868372  0.03732535 0.19166368  0.09613890 -0.13843887  0.08910946
## 3 -0.09095375  0.15686734 0.24154575  0.04425110  0.33171440  0.04163372
## 4 -0.10768376  0.25309070 0.19399293 -0.08133831  0.04524193 -0.03624171
## 5 -0.41438007 -0.04679294 0.07091498  0.23209324  0.29937910 -0.06554572
## 6 -0.22431351  0.18795443 0.19319704  0.08982865 -0.08772457 -0.02081763
##          X186        X187         X188       X189        X190       X191
## 1 -0.19206671 -0.30548364  0.006994399  0.2134836  0.17314808 -0.1767982
## 2  0.03215078  0.09690495  0.121290535 -0.1261758  0.07521509 -0.2006676
## 3  0.21201064 -0.08299304 -0.013351527  0.1059308 -0.39634535 -0.3597460
## 4  0.12012523 -0.16464174 -0.016546810  0.3063069 -0.16286238 -0.1749887
## 5  0.19117746 -0.05243383  0.327787340  0.0563608 -0.32817072 -0.3429501
## 6 -0.37060890  0.19683479 -0.091698770 -0.2627889 -0.33732793 -0.5161402
##          X192        X193        X194        X195        X196         X197
## 1  0.42591643  0.42527053 -0.28147410  0.12566161 -0.02167300 -0.080952850
## 2  0.05162452 -0.16647395 -0.20242470 -0.23535061  0.07066695 -0.002046869
## 3  0.29650570  0.03691089 -0.16623455 -0.03445784 -0.03533399 -0.192758160
## 4  0.07747985  0.03520789  0.06606477 -0.12517422  0.11128490  0.028863957
## 5 -0.20346063  0.14826514  0.04431887  0.06540897  0.09575112 -0.021845859
## 6  0.37811020  0.12997192  0.07302466 -0.33906972 -0.15699174  0.251559050
##           X198         X199       X200        X201        X202        X203
## 1 -0.001026839 -0.109367535 -0.2225502  0.01245910  0.08304803 -0.16532240
## 2 -0.170252760  0.014211359 -0.2872848 -0.11859348  0.04676875 -0.16191012
## 3 -0.049255576 -0.221797840 -0.2589406  0.00946888 -0.20863521  0.06007726
## 4  0.083063950 -0.290432500 -0.4372986 -0.08208907 -0.21667040  0.03928892
## 5  0.109488050 -0.264883460 -0.6165214  0.11145705  0.04875263  0.28323045
## 6  0.318532850  0.004148263 -0.1114905  0.07160963  0.01424022  0.22575597
##          X204        X205        X206        X207        X208        X209
## 1  0.28753900 -0.37563914  0.23024407 -0.03562003 -0.33761236 -0.18804020
## 2  0.13876185  0.05376970  0.05118274 -0.15927960 -0.01588179  0.07432910
## 3  0.03290672  0.09951092 -0.03822767 -0.18252840 -0.28835657  0.06027967
## 4 -0.18627144  0.08332904  0.07492258 -0.23383126 -0.41600380 -0.08407492
## 5 -0.01937772 -0.04458961  0.00855343 -0.09200495 -0.66255740  0.06839101
## 6  0.24290136 -0.16351415  0.23967549 -0.02327069 -0.11219372 -0.10214470
##         X210       X211        X212        X213        X214         X215
## 1 0.31371087 -0.1583320 -0.35140920 -0.30098712 -0.14440330  0.292379470
```

```
## 2 0.10763350 -0.1071177 -0.08368177 -0.08691478  0.07832102 -0.006445859
## 3 0.39991430 -0.5972207  0.14291449  0.01549724  0.10460801  0.107251674
## 4 0.29474208 -0.2751221  0.65838754  0.25398790  0.12835966  0.043866135
## 5 0.17592041 -0.2546875 -0.30601543  0.27161640  0.20186085  0.361964140
## 6 0.06059473 -0.4140534 -0.12636022 -0.30260766 -0.26940504  0.002813773
##          X216        X217        X218         X219         X220        X221
## 1  0.43658888 -0.04901969 -0.26521486  0.019232132  0.399637430 -0.03936071
## 2  0.09427576  0.08567833 -0.16462170  0.046688292 -0.007178426 -0.07764909
## 3 -0.10429516  0.10222864 -0.13523460  0.274213430  0.251872750  0.09955514
## 4 -0.19556555  0.21430705 -0.10276241  0.233367620  0.081869720  0.09147972
## 5 -0.26430100  0.06067117 -0.06871618  0.233016120  0.052960620  0.15843129
## 6 -0.16253613 -0.24368780 -0.25182053 -0.008699041  0.235300030 -0.33806880
##        X222       X223        X224         X225        X226       X227
## 1 0.2328928 -0.2897266  0.14603692 -0.086650275 -0.25467306 0.06628786
## 2 0.1584266 -0.6540977  0.05128452 -0.306058970 -0.19605868 0.19512542
## 3 0.2860389 -0.6343481 -0.17165612 -0.096478020 -0.33309606 0.44897413
## 4 0.4010880 -0.2399606 -0.18707949  0.254797800 -0.03430034 0.31794710
## 5 0.1199100 -0.3227675 -0.37569416 -0.007978584 -0.21385865 0.16548940
## 6 0.2449673 -0.3880011  0.27855050  0.065678210 -0.32141858 0.28911108
##           X228         X229        X230        X231        X232        X233
## 1  0.009125410 -0.095336100 -0.11533133 -0.22494718  0.03291914 0.16275479
## 2 -0.012097572 -0.319914580  0.00263913 -0.07636382 -0.04056317 0.06606353
## 3 -0.067875080  0.009743126 -0.18131150 -0.43401040 -0.19467698 0.09746674
## 4 -0.049416340 -0.024115052 -0.10633787 -0.37027153  0.05929866 0.27121780
## 5 -0.082409180 -0.213408200  0.03613602 -0.45584613 -0.21353425 0.25807342
## 6 -0.004155935  0.179814460  0.28061008 -0.02839342  0.21809201 0.32562402
##         X234        X235        X236        X237        X238        X239
## 1 -0.1577473  0.09298407 -0.02981915  0.01940747 -0.14619729 -0.01261792
## 2 -0.2391123 -0.08316444 -0.08467295 -0.07767836 -0.12193344 -0.02292583
## 3 -0.4168888 -0.04220274 -0.36881357 -0.28780600 -0.17804095 -0.17074166
## 4 -0.4720722  0.11693031 -0.09812263 -0.19056934  0.11503837 -0.20735316
## 5 -0.4486319  0.02920007 -0.09891724 -0.25663444  0.01296056  0.05065835
## 6  0.1254496  0.03925937 -0.29441297  0.40672868 -0.10262644 -0.18357061
##          X240         X241        X242        X243         X244        X245
## 1 -0.20750257 -0.249791560 -0.12010664 -0.08459544 -0.176224700 -0.36271970
## 2  0.05462621 -0.037153420 -0.02818135  0.10894874  0.005074762 -0.08233880
## 3 -0.24006840 -0.277456880  0.02517675  0.20274597  0.187556860  0.07220479
## 4 -0.31421733 -0.285059450  0.25779760 -0.06338455  0.160859610  0.05798380
## 5 -0.22147736 -0.263592120 -0.20185839  0.32200086  0.011482902  0.20683318
## 6 -0.11417718 -0.009765407  0.07850803  0.14735780 -0.060032490  0.17451908
##         X246      X247         X248       X249        X250        X251
## 1 -0.3474837 0.4396165 -0.250508130 0.06626445 -0.07372804 -0.27917635
## 2 -0.2138520 0.3852618 -0.247335720 0.52223307 -0.15473336 -0.12276128
## 3 -0.1412588 0.4618883 -0.079024470 0.56617266 -0.32420623 -0.12875639
## 4 -0.1439508 0.2315406  0.109090250 0.11287652 -0.24632253 -0.15640910
## 5  0.2228567 0.5481906  0.370208000 0.21199164 -0.37562400 -0.03718609
## 6 -0.4626457 0.3674672  0.007582737 0.09803680 -0.10472117 -0.18678223
##          X252         X253        X254         X255        X256        X257
## 1  0.04891941  0.019303128 -0.36622990  0.227423890 -0.27978998 -0.04844415
## 2  0.01167572  0.012793078  0.07659441 -0.001855513 -0.13591422  0.34589600
## 3 -0.25149164  0.010381632 -0.51347110  0.032044373 -0.01489544  0.29160714
## 4 -0.38530758  0.038406240 -0.53427273  0.116035600  0.11466099  0.19875416
## 5  0.14670801 -0.015489628 -0.09131973 -0.076476140 -0.20513336  0.09639776
## 6 -0.06991669 -0.007246775  0.12023344  0.413038130  0.10283223  0.03074469
```

```
##          X258        X259      X260         X261        X262        X263
## 1 -0.27474093 -0.08863648 0.4923174 -0.091491580 -0.55696850  0.15258238
## 2 -0.06543445 -0.02852708 0.3138412  0.005989261 -0.23266204  0.01278037
## 3 -0.22402498 -0.47876924 0.3034157 -0.174534720 -0.14114714 -0.12743498
## 4 -0.05671836 -0.38956267 0.1400722  0.000393416  0.09798099 -0.24569897
## 5 -0.06132543 -0.09994126 0.1722290 -0.118548565 -0.12797640 -0.26940605
## 6  0.13378651  0.13570933 0.3728803  0.192830620 -0.25542447 -0.20452605
##          X264         X265        X266      X267        X268        X269
## 1  0.22723620  0.047296360  0.03777911 0.1021252  0.08917377  0.18320873
## 2  0.32625186  0.068292930 -0.07912376 0.4202766  0.02905514 -0.01447288
## 3  0.31296557  0.002224314  0.09450821 0.5365813 -0.21820231 -0.09134804
## 4  0.03555339 -0.105802834 -0.03294069 0.4552424 -0.07953740 -0.07168483
## 5  0.17209810  0.018968843 -0.24674992 0.2854451 -0.15615045 -0.25075784
## 6 -0.01332169  0.103204030 -0.09526886 0.3746913 -0.04751929 -0.11190992
##          X270       X271        X272        X273        X274         X275
## 1  0.15654585 -0.1499869 -0.22383201 -0.34238324  0.40297803 -0.133566230
## 2 -0.18000962 -0.2370202 -0.03287778 -0.17744550  0.24356888 -0.228184790
## 3 -0.08563096 -0.1438107 -0.32098820  0.05086004 -0.05641183 -0.340582940
## 4 -0.11316276 -0.2451500 -0.13510320  0.30941364 -0.07572503 -0.149168310
## 5  0.01975317 -0.1532024 -0.04846752  0.20188378 -0.05405645 -0.113221355
## 6  0.03705194 -0.1391767 -0.03591009 -0.17221928  0.37328140  0.005774962
##        X276        X277        X278        X279        X280        X281
## 1 0.1230013  0.10894274  0.44801095  0.26090938 -0.03062845  0.07029194
## 2 0.1518698 -0.22744925 -0.06707738  0.06912960  0.06008390 -0.22510664
## 3 0.1734722  0.00369754  0.10416457 -0.10270592  0.28316048  0.07522166
## 4 0.1350561  0.24802405 -0.06726912 -0.11683456  0.21722907  0.23568027
## 5 0.3275076  0.10677812  0.01674901 -0.06682326  0.17737103  0.75085270
## 6 0.2799568  0.06543998  0.30005538  0.46010366 -0.16525010  0.02038636
##          X282        X283       X284        X285        X286        X287
## 1  0.05599202  0.13128878 0.30965513  0.05133245  0.07200967 0.158545960
## 2  0.03476552  0.21450576 0.18567912  0.01475821 -0.07051003 0.185279770
## 3 -0.43320683  0.20971571 0.34387383 -0.25124446  0.05295736 0.110491770
## 4 -0.05238910  0.06975254 0.23956272 -0.17436938 -0.08903540 0.002778950
## 5  0.05718695 -0.09480550 0.41533700  0.02560427 -0.28287005 0.009337672
## 6  0.21839337  0.03122385 0.03677826 -0.26076150 -0.22533481 0.174768220
##          X288        X289          X290       X291       X292         X293
## 1  0.12478771 -0.05030283 -0.1744324300  0.2355763 0.18841693  0.095850170
## 2 -0.08372230  0.05627263 -0.0001537617  0.3102088 0.08275127  0.065967260
## 3  0.06493770 -0.06645308  0.2771368600  0.2216559 0.41141325 -0.043637615
## 4  0.09597004  0.10117406  0.5804598300 -0.1396173 0.30341816 -0.006686681
## 5 -0.11460640 -0.12092313  0.2925460000  0.2083435 0.13608679  0.023950122
## 6  0.14580010  0.36671516 -0.0282308250  0.4526211 0.60091460  0.284186360
##          X294        X295        X296       X297         X298       X299
## 1  0.05958545 -0.26181397 -0.12942682  0.1106530  0.111098660 0.04712391
## 2 -0.12667632  0.10647926  0.20570675 -0.1185442 -0.025972893 0.21868058
## 3 -0.12639478  0.27183574  0.36764577 -0.5079815 -0.134483500 0.12644708
## 4 -0.17932889  0.13940029  0.23461391 -0.4709817 -0.132262950 0.34416717
## 5  0.07003969  0.05062050  0.22549320 -0.4334845 -0.227295250 0.03496791
## 6 -0.32252946 -0.02636443 -0.02568395 -0.5449139  0.001921349 0.17711720
##          X300        X301        X302        X303         X304        X305
## 1  0.08990387 -0.06111330 -0.01124704  0.05479610 -0.190887210 -0.02162724
## 2 -0.04925900 -0.06926133 -0.20349246 -0.05635802 -0.121154375 -0.11133145
## 3  0.07373585  0.01449330 -0.16972028 -0.06998153 -0.115958190  0.05582814
## 4 -0.07534424  0.28456753  0.11769196  0.05158312  0.002276873  0.34534612
```

```
## 5 -0.07465985 -0.05708794 -0.12490057  0.16176037  0.010797251  0.36599636
## 6 -0.08354086 -0.16851516  0.18554412 -0.07663448  0.072129570  0.03811707
##         X306        X307        X308        X309        X310        X311
## 1 0.26825586  0.14959294 0.003617788 -0.42931880  0.15043205 -0.37504563
## 2 0.03114838  0.03721712 0.303255100 -0.04098415 -0.01045364  0.13655819
## 3 0.42169747 -0.21300146 0.178850020 -0.56118840 -0.18253075 -0.01390608
## 4 0.38116553 -0.34837744 0.166838740 -0.45003930  0.02532300  0.06130882
## 5 0.14306547 -0.03593042 0.169301210 -0.35818785  0.23250537 -0.32952026
## 6 0.13763840  0.22003089 0.115806550 -0.23842824 -0.02690947  0.03253251
##         X312         X313        X314       X315        X316         X317
## 1 0.02789153  0.241601210  0.21493769 0.24440613 -0.42065617 -0.086467475
## 2 0.01823851  0.059292722  0.08884950 0.25151467  0.02146947  0.103465720
## 3 0.31121963 -0.087298460  0.02600313 0.06498746 -0.22674258  0.001650792
## 4 0.13149590  0.007515826  0.03898556 0.05628781 -0.26575595  0.146196620
## 5 0.08163007 -0.154201420 -0.06255034 0.05398887 -0.18597327  0.492797730
## 6 0.16116643  0.095734620 -0.04492413 0.13831733 -0.22790310  0.084574660
##          X318       X319         X320        X321        X322        X323
## 1 -0.17332317 -0.4764731 -0.111852735  0.10149532 -0.02073869  0.36234817
## 2  0.18639573 -0.8095084  0.046272807 -0.06979964 -0.46546290  0.14244660
## 3 -0.10471823 -0.8805178 -0.060743716  0.40926160 -0.27070823 -0.14667453
## 4 -0.25226050 -0.5078095 -0.131631360  0.44533935 -0.16172437 -0.10892484
## 5 -0.20555784 -0.4739399 -0.004465971  0.15549606 -0.11687715  0.05189369
## 6 -0.06157368 -0.4749866 -0.063617710  0.09550637 -0.07704561  0.03434662
##         X324         X325        X326        X327        X328         X329
## 1 0.06934232  0.161212580  0.14933090 -0.23701346  0.11946166 -0.354803560
## 2 0.11925222  0.135007460 -0.10524715 -0.26256004  0.01029534  0.042808670
## 3 0.08631313 -0.005369183  0.09240440  0.04822368 -0.01293436 -0.378499950
## 4 0.06872611 -0.076837600 -0.05202009  0.23586749  0.08033565 -0.008865438
## 5 0.04211814 -0.173468560 -0.15015069  0.08924362  0.34655940 -0.016676258
## 6 0.12494963  0.267011880  0.30707020 -0.36884955 -0.23858562  0.205878110
##          X330        X331        X332        X333        X334          X335
## 1 -0.02358162 -0.06978546  0.12975222  0.16794725  0.29827250  0.0004056135
## 2 -0.13053603  0.17137514 -0.18212008  0.08917274  0.15613817  0.1643371400
## 3  0.19485725 -0.01450265  0.01438312  0.04981846  0.23257495  0.3486512300
## 4  0.52171713 -0.10982202 -0.03766324  0.21146667  0.19236839  0.1456411300
## 5  0.05101300 -0.34187573  0.29139840 -0.18924575 -0.01817033 -0.0433402200
## 6 -0.07757715  0.07498973 -0.35873792 -0.12468971  0.27267110  0.2442977700
##           X336         X337          X338       X339      X340        X341
## 1  0.177666600 -0.098660530 -0.0219108180  0.2629319 0.1494135 0.24968462
## 2 -0.152574720  0.010509073  0.0364773120 -0.2235032 0.1181459 0.22427106
## 3 -0.096260330 -0.029991418  0.1956212200  0.3341183 0.4134726 0.40476590
## 4 -0.150278570 -0.003214074  0.1551904200  0.4696210 0.1663639 0.42412466
## 5 -0.003126342 -0.058145925  0.0005654864  0.1906268 0.3927596 0.03533957
## 6  0.065145950  0.265352430 -0.1594228600  0.1106320 0.1829114 0.35314170
##          X342        X343       X344       X345       X346         X347
## 1  0.09267649 -0.03983721  0.3555983 0.08908885  0.1082202  0.239273600
## 2  0.14711341  0.02685771 -0.0742145 0.21387526 -0.1687383 -0.116996200
## 3 -0.17567204  0.29711533  0.1489908 0.58919495  0.2463056 -0.181071980
## 4 -0.19775657  0.33431667  0.1310592 0.28344685  0.4131224  0.235679730
## 5  0.07842728  0.35642666  0.1408707 0.37270950  0.3489954  0.007734960
## 6 -0.37739670 -0.19648111  0.2608737 0.10371717  0.3440046 -0.002148003
##          X348        X349        X350      X351        X352        X353
## 1  0.10781701  0.11976284 -0.07546131 -1.123180 -0.08830957 -0.18401437
## 2  0.12769951  0.06184119  0.11835110 -1.053988 -0.28272936  0.08813658
```

```
## 3  0.06491380 -0.12289578  0.08893049 -1.935510 -0.03308295  0.23001614
## 4 -0.15273891 -0.08928406 -0.03458375 -2.098822  0.09655976  0.37082043
## 5  0.28381008 -0.13170223  0.05475353 -1.959567 -0.12873219  0.25097390
## 6 -0.08568027 -0.12097745  0.09624431 -1.701305 -0.30736130 -0.21666926
##          X354       X355        X356        X357        X358        X359
## 1 -0.13502572 0.14387232 -0.11910473  0.12501182 -0.08796709 -0.12611572
## 2 -0.09558823 0.23869020  0.15476526  0.02169239  0.19729339  0.09235955
## 3 -0.35671797 0.55488616  0.16232769  0.17087357 -0.12052818 -0.10229787
## 4 -0.28467366 0.35571140 -0.02972367  0.11018293  0.01188009 -0.19310420
## 5 -0.22365108 0.61613774  0.18926308  0.28541413  0.22185590  0.17309481
## 6 -0.13801499 0.04958088 -0.10744368 -0.04950230 -0.05193848 -0.20645976
##         X360        X361        X362       X363        X364         X365
## 1 0.04298443  0.60177237  0.14368924 -0.1027599 -0.10326459  0.004502531
## 2 0.14574647  0.06386233 -0.02113802  0.2383660  0.03158547  0.088461180
## 3 0.28332368 -0.16265537  0.03687236  0.1450864 -0.30318790 -0.152575630
## 4 0.24109808 -0.11365142 -0.03473418  0.0308506 -0.13431473 -0.135689440
## 5 0.05226219 -0.05389039  0.20130298  0.2367635 -0.03183036 -0.009483949
## 6 0.08130291  0.56563133  0.13576318  0.2694787 -0.25842760  0.026112134
##         X366        X367        X368        X369        X370        X371
## 1 -0.3908216  0.02699675  0.29327030  0.05766370 -0.07308041 -0.23861833
## 2 -0.1845963 -0.01466343 -0.04143428  0.12504807 -0.01165735  0.27516450
## 3 -0.3777711 -0.09176481 -0.22883100  0.35586113  0.05467660  0.09507194
## 4 -0.5997052 -0.13190414 -0.13815361  0.31029332  0.11012910  0.13044043
## 5 -0.1482956 -0.21557209 -0.09670579  0.11201896  0.06678737 -0.18813080
## 6 -0.1903244 -0.20323184  0.17126545 -0.05269674 -0.02176836  0.28437987
##          X372        X373       X374        X375        X376        X377
## 1  0.31085443 -0.27022990 0.08762686 -0.02887934  0.13095675 -0.06682418
## 2  0.15532768  0.12500520 0.12617620 -0.08837882  0.02815210 -0.05813534
## 3  0.03749319  0.01826829 0.39337670 -0.14433130  0.08852126 -0.08399173
## 4 -0.12060653 -0.10266505 0.33093223 -0.18540803 -0.16203120 -0.12169313
## 5 -0.17039673  0.14171405 0.29394385 -0.23836400 -0.00113312  0.07318302
## 6  0.13520524  0.02522874 0.12932384 -0.02199030 -0.02264631  0.06566036
##          X378        X379        X380        X381        X382        X383
## 1 -0.38795730  0.11613764 -0.24011247 -0.28759685 -0.30549240  0.03368242
## 2 -0.28581360  0.19168624  0.13777850 -0.06586509 -0.06349335  0.29464600
## 3 -0.40614054 -0.09950261  0.05392457  0.10187504 -0.09481762  0.03841895
## 4 -0.45923440 -0.14814900  0.03866845 -0.02191722 -0.07997540 -0.32813367
## 5 -0.34010348  0.01032152  0.18441217  0.04591248 -0.19427246  0.16637954
## 6 -0.01336716  0.33994144  0.13124946 -0.16348755 -0.10327753 -0.08101543
```

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head(climateact_word)
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## 2    2 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 3    3 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 4    4 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 5    5 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
## 6    6 509ba06d0627fb570e93eb4b98d21daa_t1   t1 experimentalGroup
##                                  wordID                        word valence
## 1 ea6df036-7343-48ee-9e3c-98a26623001e                 Klimagesetz      -3
## 2 b73473bb-de71-47c2-a1f4-9e178450d70a                       Teuer      -2
## 3 debed5f6-70f7-429b-b366-d59af20cab4e               Stromteuerung      -2
## 4 8aa877cd-395d-453d-9d29-e87a0d23be01 Hohe Kosten  Stromleitungen      -2
```

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## 5 a3aa6fa7-1e58-4342-be99-0c1c69ceea0b            PV privat Unsinn      -2
## 6 88c1a997-d441-4820-a3f0-1bfc04d44e12         Wirkung global Null       2
##                                                  firstOrder comment
## 1  Stromteuerung ## PV privat Unsinn ## Wirkung global Null    <NA>
## 2 Hohe Kosten  Stromleitungen ## Mangellage Winter ungelöst    <NA>
## 3                Klimagesetz ## Hohe Kosten  Stromleitungen    <NA>
## 4                                  Teuer ## Stromteuerung    <NA>
## 5                 Klimagesetz ## Mangellage Winter ungelöst    <NA>
## 6                     Klimagesetz ## Technologien fördern !    <NA>
##                     sentence intendedVote.x ratingLaw.x mean_valence_macro.x
## 1                 Klimagesetz               0           1               -1.125
## 2                       Teuer               0           1               -1.125
## 3               Stromteuerung               0           1               -1.125
## 4 Hohe Kosten  Stromleitungen               0           1               -1.125
## 5            PV privat Unsinn               0           1               -1.125
## 6         Wirkung global Null               0           1               -1.125
##            X0         X1          X2         X3        X4          X5
## 1  0.02261609 0.41567880  0.13157149  0.3202330 0.4779559  0.06018003
## 2  0.11673464 0.30732363 -0.06839614 -0.2480668 0.1167039 -0.07126695
## 3 -0.09475741 0.56212765 -0.04419769  0.2923742 0.3247700 -0.19319071
## 4 -0.09993468 0.26121920  0.10122752  0.1628261 0.1066939 -0.24150708
## 5  0.06135034 0.27195835 -0.09215593 -0.2275685 0.2001318 -0.26117945
## 6 -0.34348840 0.07295866 -0.05184497 -0.1044376 0.1155727 -0.24980439
##            X6         X7          X8          X9         X10         X11
## 1  0.02622875 -0.1372136 -0.03204702  0.34285630 -0.19240779 -0.47685114
## 2  0.34281245  0.5160920  0.17544468 -0.01867275  0.15530382 -0.10073654
## 3  0.24289179  0.2777272  0.01902590  0.09324283 -0.08472029 -0.03714182
## 4  0.14384507  0.2506189  0.03405216 -0.02476181  0.01331178  0.02768885
## 5 -0.03734094  0.3461760  0.02038925  0.11345073  0.28338066  0.10042357
## 6  0.03101562  0.4375031 -0.15477693  0.41885373  0.08501530 -0.36997896
##            X12         X13         X14         X15         X16        X17
## 1 -0.017735418 -0.04940423 -0.01423884  0.05539362 -0.21794201 -0.2155607
## 2  0.101379775 -0.19449480 -0.04100733 -0.16848433  0.11261106  0.2488487
## 3  0.002967140 -0.20247406 -0.21098532  0.28277305 -0.01656694  0.1876836
## 4  0.001675247 -0.06422734 -0.20862868  0.36352074  0.08941129  0.1274105
## 5  0.314642880 -0.04545225  0.01339511  0.09173759  0.05667191  0.1238906
## 6  0.124764204  0.26400763 -0.23645282  0.13886662 -0.14850238 -0.1038428
##           X18         X19        X20         X21          X22         X23
## 1 -0.02849606 -0.09328964 0.27199230  0.27904817 -0.144245540  0.11836611
## 2  0.13379698 -0.15420641 0.09610786  0.01248386  0.052945547 -0.07483935
## 3  0.07097083 -0.24048527 0.60103595 -0.28809088 -0.074692465 -0.21078518
## 4 -0.12667732 -0.09415310 0.13523746 -0.26643413  0.002162269 -0.14335620
## 5  0.11725038  0.42703325 0.24013029 -0.46909866 -0.035167010 -0.23104742
## 6 -0.24256808  0.01773300 0.22207978 -0.29998168 -0.031697540  0.13117085
##            X24         X25         X26          X27         X28         X29
## 1 -0.031293597 -0.10157197 -0.31222078 -0.052827336 -0.10898636  0.05909189
## 2 -0.013049739 -0.24674174 -0.19754483 -0.051803720  0.09992157 -0.44714794
## 3  0.001423934  0.05746386  0.07263113 -0.003051654 -0.18861936 -0.53515637
## 4  0.051393770  0.24920171  0.17521483  0.157853650 -0.13939363 -0.28144740
## 5 -0.013242474 -0.05420180  0.17718163 -0.005424962 -0.30387446 -0.23520833
## 6  0.285286660  0.22772983 -0.35720918 -0.174074650  0.11661161 -0.14467879
##           X30          X31         X32        X33         X34       X35
## 1  0.09113851 -0.024481092  0.03568596 0.03692838  0.23499915 0.1965462
## 2  0.03237359 -0.167846140 -0.08676649 0.12442964 -0.04454695 0.3838497
```

```
## 3 -0.09199998 -0.024737718  0.06257919 0.31325630  0.19448473 0.3207063
## 4 -0.12388845 -0.105317460  0.05637392 0.11877028 -0.05466450 0.2952493
## 5  0.06894141 -0.267906220 -0.22123809 0.33757186  0.15954068 0.3585013
## 6 -0.14486378 -0.009222079  0.12243079 0.04758515  0.22678880 0.3662645
##           X36         X37         X38          X39         X40         X41
## 1  0.24942935 -0.19286329 -0.21103084  0.282401100  0.05464749 -0.20058784
## 2 -0.12261450  0.05182374 -0.01613143  0.000815781  0.04964673 -0.09202080
## 3  0.27342230  0.12402918  0.19043050  0.092332780  0.16009766 -0.36174858
## 4  0.35327482  0.03639930  0.11481265  0.059066810  0.17742772 -0.04379446
## 5  0.22884113 -0.14950807 -0.19346915 -0.188837440  0.16779454 -0.45333028
## 6 -0.01795094  0.10310605 -0.41067964  0.162330390 -0.07511289  0.17571895
##           X42         X43          X44          X45         X46         X47
## 1  0.30684853  0.32606420  0.002487744  0.261954840 0.11445024 -0.28538978
## 2 -0.04898478  0.26648710  0.013457343 -0.004464989 0.03895296  0.04595191
## 3 -0.03975003  0.12713142 -0.037617090  0.154113810 0.21541070 -0.49815205
## 4 -0.43422407 -0.09255642 -0.142312330 -0.030230230 0.20946140 -0.45659128
## 5  0.06324089  0.15518485  0.059320915  0.272178920 0.09909050 -0.19242679
## 6  0.19114617  0.31493440  0.118282300  0.115549220 0.13426967 -0.17650893
##           X48         X49         X50         X51           X52         X53
## 1 -0.05714510  0.08293119 -0.08387188 -0.22035404 -3.595690e-01 -0.10147698
## 2 -0.34204876  0.16887441  0.09101259 -0.01707159 -1.248284e-02  0.07121288
## 3 -0.07969356 -0.20661755  0.57150930  0.10445198 -1.645932e-01 -0.01992646
## 4  0.03745114 -0.11996632  0.43207080  0.37231657 -2.360882e-05  0.09702335
## 5  0.13413470 -0.38620988  0.25267850 -0.06418447 -6.003303e-02 -0.08086141
## 6 -0.16030437 -0.31614810  0.15366104  0.21761297 -1.135696e-01 -0.21328756
##           X54         X55         X56         X57         X58         X59
## 1 -0.24119572  0.04545888  0.14886174 -0.03612012 -0.04343227 -0.57752100
## 2  0.14703867  0.22788726  0.01723466  0.22426940  0.07862089 -0.05635640
## 3  0.19111022 -0.05038616  0.19886590 -0.09438688  0.48041190 -0.41292235
## 4 -0.02336122 -0.33649862  0.13122399 -0.03739687  0.35045594  0.01400799
## 5 -0.22903545  0.04894703  0.28605476  0.13601086  0.16325001 -0.21457338
## 6  0.02243698 -0.01215132 -0.26649547 -0.38620076 -0.42856503 -0.46744037
##            X60         X61        X62        X63        X64         X65
## 1 -0.264166270 -0.02009833 -1.1681505 0.06969843  0.1696003 -0.07117768
## 2  0.125102460 -0.03296541 -1.3464280 0.38523632 -0.2585847 -0.04047498
## 3  0.006867779  0.13804646 -0.2332195 0.27708378 -0.2523540 -0.03680314
## 4 -0.336306200  0.12349646 -0.3640960 0.07938382 -0.2388077 -0.07389593
## 5 -0.088128015 -0.08198283 -0.4612989 0.17990208 -0.1491646  0.13957387
## 6 -0.202797890 -0.15155788 -0.7621882 0.07264986  0.4900653  0.03395813
##           X66         X67         X68         X69         X70         X71
## 1 -0.07239136  0.06761839  0.22860266 0.06079763 -0.05651608  0.28151214
## 2 -0.12089296  0.08686645 -0.06015658 0.35924700  0.05906856 -0.11939020
## 3 -0.02689623  0.01640584  0.02708583 0.16415090  0.13204518 -0.14695013
## 4  0.08858283  0.11665335 -0.07163857 0.08244424 -0.10863674 -0.08490578
## 5  0.15368890  0.03494622  0.00328467 0.17642505 -0.04796543  0.08835253
## 6 -0.02727154 -0.34995790 -0.01149069 0.18494277 -0.06238855 -0.09688488
##           X72         X73         X74          X75         X76       X77
## 1 -0.024670647 -0.20780876 -0.08054124  0.012136006  0.35863823 0.4180733
## 2  0.058090030  0.30339453  0.08014541 -0.111489150 -0.01244491 0.3292792
## 3  0.021261055 -0.16217732 -0.15235294 -0.110418100 -0.11313064 0.4613398
## 4 -0.044725537 -0.08342224 -0.19510044  0.238595650 -0.05326193 0.3021275
## 5 -0.253902970  0.04100412 -0.05606092  0.009424857  0.05949497 0.3630943
## 6 -0.006438684 -0.08809965  0.21353897 -0.143775020  0.14862294 0.2815050
##           X78         X79        X80         X81         X82         X83
```

```
## 1  0.27518070 -0.18639407 0.03621901 -0.09677085 -0.05780701 -0.02967132
## 2 -0.22308573 -0.08765344 0.16574177  0.05570852 -0.08670637 -0.22551684
## 3 -0.04181961 -0.24502316 0.25645727 -0.05899211 -0.30337995 -0.02076655
## 4  0.10962679 -0.22880477 0.17940627 -0.16424206 -0.36757007  0.15254202
## 5  0.27772093 -0.25224856 0.54992384  0.38994595 -0.26484123  0.08329200
## 6  0.34761897  0.29598004 0.28941658 -0.06638970  0.24752475 -0.11612035
##           X84         X85         X86         X87        X88         X89
## 1 -0.05591200 -0.11392505  0.42185688 -0.14972503 0.41028306  0.04735265
## 2 -0.16755603  0.22431758 -0.09933285  0.01252485 0.12054226 -0.05449719
## 3  0.06108426  0.44503304  0.30392197 -0.08747853 0.22897494  0.06428216
## 4  0.04605288  0.17331250  0.44446170 -0.07600475 0.08054793 -0.26786770
## 5 -0.26013392  0.26287064  0.13388382 -0.28307834 0.05239553 -0.41324340
## 6 -0.09380734 -0.08587175  0.28630130 -0.28828454 0.17306514 -0.27693778
##           X90          X91          X92           X93        X94        X95
## 1  0.15988353 -0.041171953  0.420263380 -2.003800e-01 0.01449173  0.3301413
## 2  0.30134922 -0.188481660  0.288723980 -4.485671e-02 0.23899221  0.1242628
## 3  0.20939632  0.155975090  0.123546820 -3.279490e-02 0.25015050 -0.1711615
## 4  0.37566766  0.171494960  0.123473026 -7.320157e-02 0.17332780  0.2639253
## 5 -0.07408339  0.008258324 -0.008781432  7.305174e-05 0.29026723 -0.2341570
## 6  0.02707455  0.174918430  0.098890886  8.100611e-02 0.03303280  0.1404468
##          X96         X97        X98      X99        X100        X101
## 1  0.1789841 -0.10738464 0.26415864 1.520391 -0.12734832 -0.03562856
## 2  0.1999191 -0.07634799 0.15834163 1.957760 -0.01778265  0.10021588
## 3 -0.2108436 -0.55675250 0.17671376 2.413126 -0.07501025  0.02730165
## 4 -0.1773120 -0.28523560 0.02451988 1.022113 -0.04145790  0.07408847
## 5 -0.2636065 -0.40006036 0.06786461 1.321589 -0.08544987  0.17517476
## 6  0.2743015  0.02632959 0.01739252 1.401766  0.28481087  0.20659359
##           X102        X103        X104        X105       X106        X107
## 1 -0.260461630  0.43391022  0.07947432 -0.23145650 0.24440816  0.04043056
## 2 -0.030718544  0.15720217 -0.08931929 -0.14037964 0.10058472 -0.05728476
## 3 -0.007698914  0.25152820 -0.08058914 -0.12650347 0.00165032  0.23292597
## 4 -0.010172198  0.15488602 -0.18808344  0.01945245 0.01252361  0.36699307
## 5 -0.149075240 -0.02094668  0.02780969 -0.06996036 0.32159394  0.47844600
## 6 -0.290088700 -0.08990430 -0.23883103  0.08746920 0.05257041  0.13858880
##           X108       X109        X110        X111         X112        X113
## 1  0.300014380 -0.2347584 -0.18578328 -0.06113918 -0.066009810 -0.18043081
## 2 -0.043421734  0.1440315 -0.23529367  0.05729066 -0.090580060 -0.22782670
## 3 -0.021570360 -0.3192053  0.18338658 -0.03683810 -0.129730370 -0.02150692
## 4  0.008872049 -0.4041843  0.07049349 -0.24874832 -0.043328680  0.13202840
## 5  0.208186460 -0.1637248 -0.20932582  0.10092684 -0.201424420 -0.11077157
## 6  0.036945330  0.1498832  0.12326211 -0.12061304 -0.002387389  0.14473943
##          X114         X115        X116       X117        X118         X119
## 1  0.08110253 -0.121727390  0.14496079  0.2272206 -0.08536288  0.038887240
## 2  0.08921979 -0.005500472 -0.14407608  0.1014702  0.15759039  0.238479300
## 3  0.31901400 -0.108669420  0.03028820 -0.1297392  0.19473177  0.230518310
## 4  0.23932773 -0.018176574 -0.19296382 -0.1077768  0.18487175  0.003007852
## 5  0.19480062 -0.069643900 -0.12483952  0.4015840  0.08765770 -0.132033960
## 6 -0.33996367 -0.197824020  0.07439195  0.2572827  0.10913359  0.232203100
##           X120        X121        X122         X123        X124        X125
## 1 -0.404084400 -0.25195068  0.03452230 -0.036925886  0.09061310 -0.48035932
## 2 -0.083462500  0.07791138 -0.09407581  0.038590685 -0.09591089 -0.60188633
## 3 -0.163613780  0.22674185 -0.02685359 -0.007040927  0.27778235 -0.62161700
## 4 -0.322981660  0.17901565  0.10386873  0.218015220  0.17469980 -0.38143450
## 5 -0.097742600  0.04722916  0.24149841 -0.126709970  0.01571999 -0.50445500
```

```
## 6  0.001346793 -0.52718150  0.03269693 -0.011201181 -0.13356619 -0.09322557
##         X126        X127        X128        X129        X130        X131
## 1 0.33395922 -0.06818706  0.22271234 -0.22898622  0.07355142  0.11846305
## 2 0.28803504  0.21142730 -0.14504126  0.08128538  0.17951448  0.22311194
## 3 0.32719022  0.27244523 -0.28196192  0.01128709 -0.12122413 -0.01457459
## 4 0.22565706  0.35564520 -0.01824545 -0.00788381 -0.07331645 -0.06476910
## 5 0.20110825  0.37954462 -0.22459844  0.24143665 -0.04022129 -0.10045232
## 6 0.01718577  0.16829845 -0.02362473 -0.21909437  0.14138201 -0.10899671
##          X132      X133        X134        X135        X136        X137
## 1 -0.02385168 0.2006663 -0.21867393 -0.21208340  0.25587913  0.44585013
## 2  0.16190287 0.1320642 -0.11139327 -0.03563640  0.10002566  0.08726547
## 3 -0.09958005 0.1189813 -0.16308033  0.05069763  0.04392216  0.17822865
## 4 -0.09188741 0.1964263 -0.09004974  0.08609492  0.22384925  0.19602327
## 5 -0.17735553 0.1149955  0.22169495  0.26798683 -0.09637214 -0.21297778
## 6 -0.09087955 0.1470817 -0.41388370 -0.04915237  0.31061095  0.21915357
##          X138        X139        X140      X141        X142        X143
## 1 0.002349995  0.29737183  0.09137628 0.2802852  0.12117270  0.07921332
## 2 0.109020830 -0.33334932 -0.39003536 0.2136443 -0.02116551 -0.01598707
## 3 0.379259020  0.21943913 -0.15782902 0.3197749  0.40509227 -0.15402801
## 4 0.067937076  0.26102528 -0.01294356 0.2192316  0.25521650 -0.14872721
## 5 0.359854220  0.04373307  0.03596201 0.3309037  0.35212030  0.13758200
## 6 0.066416650  0.36098626  0.23259918 0.2539387  0.02304904  0.09429134
##           X144        X145        X146        X147        X148         X149
## 1 -0.029304912  0.04640056 -0.16555507  0.01481730 -0.23549990 -0.013860919
## 2 -0.024764067 -0.09172882 -0.18043843 -0.53458416 -0.01483851  0.235814470
## 3  0.172329470 -0.31512254 -0.56042737 -0.01878885  0.03928582  0.009338447
## 4 -0.006528052 -0.15048550 -0.20963861  0.22446784  0.17541814 -0.131201600
## 5  0.046239700  0.07886729  0.13349533 -0.12419848  0.09371684  0.361252370
## 6 -0.067228640  0.13814805  0.07699314  0.21907751  0.08659186 -0.316247200
##         X150        X151         X152        X153        X154        X155
## 1  0.2470664  0.03049158  0.009443624  0.07457122 0.416194230  0.08786263
## 2 -0.1412274  0.02896320 -0.021902407  0.05395132 0.183592830 -0.12045333
## 3  0.2471782  0.05418564  0.115203336 -0.09837905 0.129356830 -0.18641935
## 4  0.3551978 -0.08051868  0.490390720  0.03180928 0.211002420 -0.07634156
## 5  0.6077831  0.16386843  0.219030900 -0.44068515 0.174287600 -0.22170687
## 6  0.2255308  0.23341256 -0.068985130  0.24986550 0.007210231 -0.22009896
##          X156        X157         X158       X159         X160       X161
## 1 -0.03656142 -0.05654274  0.387659880 0.23511134 -0.058851820  0.3595527
## 2  0.12734564 -0.19134301  0.044715036 0.17665274 -0.137908860  0.2534820
## 3  0.06568932 -0.05623423  0.432662220 0.28233775 -0.064131520  0.3056374
## 4  0.11642799  0.03183958  0.315607550 0.01729675  0.150261330  0.2029412
## 5  0.09093915  0.03850016 -0.004594806 0.09812836 -0.007539874  0.0502291
## 6 -0.27064830 -0.14588127  0.237385170 0.13074315  0.094662370 -0.1087397
##         X162        X163        X164       X165        X166        X167
## 1  0.2454160 -0.05186247  0.13887885 -0.1222296 -0.07313665  0.09697939
## 2  0.2047987  0.09132326  0.05893046 -0.1341088  0.05736413  0.04043398
## 3 -0.2178054 -0.06256635 -0.22434630 -0.1920804 -0.20836318  0.03553380
## 4 -0.1332563 -0.15382968 -0.14428438  0.0778507 -0.15612075 -0.04830385
## 5  0.2016113  0.08711220 -0.19777776 -0.3718700 -0.07135798 -0.26853140
## 6 -0.3136659 -0.19229095  0.02924709  0.3923129  0.06844054  0.09351880
##          X168        X169         X170        X171         X172         X173
## 1  0.48890767  0.04108002  0.254302830 -0.47432145 -0.087799680 -0.322764100
## 2  0.17839870  0.14540565  0.132463720 -0.11750524 -0.109296520 -0.006134426
## 3  0.10103197  0.11519057  0.410390850 -0.09680297  0.254088460 -0.083300250
```

```
## 4  0.09625446 -0.34619284 -0.001349966  0.14348702  0.085062500  0.278696900
## 5  0.08198486  0.09303701  0.134906020  0.04700267  0.004854675 -0.052808475
## 6 -0.22081156  0.11562558  0.160196680 -0.36987892  0.053883184 -0.135739360
##          X174         X175         X176       X177        X178        X179
## 1 -0.05979318  0.092390390 -0.115239410 0.24847019 -0.24209880  0.25823748
## 2 -0.05300963  0.005514477 -0.069149640 0.04562229 -0.06718183  0.14632235
## 3  0.06167350 -0.040593100 -0.003851859 0.27870438 -0.47782713  0.22243597
## 4  0.15123238 -0.225183640 -0.194270820 0.22751180 -0.48580750  0.18973902
## 5  0.18065323 -0.342552450 -0.360442100 0.13205208 -0.44722226  0.06634392
## 6  0.40999818 -0.082599506 -0.217404100 0.21312930  0.02740563 -0.35850123
##          X180        X181       X182        X183        X184        X185
## 1 -0.12012038 -0.16850738 0.04191121  0.11273575  0.12773839  0.07525615
## 2  0.08868372  0.03732535 0.19166368  0.09613890 -0.13843887  0.08910946
## 3 -0.09095375  0.15686734 0.24154575  0.04425110  0.33171440  0.04163372
## 4 -0.10768376  0.25309070 0.19399293 -0.08133831  0.04524193 -0.03624171
## 5 -0.41438007 -0.04679294 0.07091498  0.23209324  0.29937910 -0.06554572
## 6 -0.22431351  0.18795443 0.19319704  0.08982865 -0.08772457 -0.02081763
##          X186        X187         X188       X189        X190       X191
## 1 -0.19206671 -0.30548364  0.006994399  0.2134836  0.17314808 -0.1767982
## 2  0.03215078  0.09690495  0.121290535 -0.1261758  0.07521509 -0.2006676
## 3  0.21201064 -0.08299304 -0.013351527  0.1059308 -0.39634535 -0.3597460
## 4  0.12012523 -0.16464174 -0.016546810  0.3063069 -0.16286238 -0.1749887
## 5  0.19117746 -0.05243383  0.327787340  0.0563608 -0.32817072 -0.3429501
## 6 -0.37060890  0.19683479 -0.091698770 -0.2627889 -0.33732793 -0.5161402
##          X192        X193        X194        X195        X196         X197
## 1  0.42591643  0.42527053 -0.28147410  0.12566161 -0.02167300 -0.080952850
## 2  0.05162452 -0.16647395 -0.20242470 -0.23535061  0.07066695 -0.002046869
## 3  0.29650570  0.03691089 -0.16623455 -0.03445784 -0.03533399 -0.192758160
## 4  0.07747985  0.03520789  0.06606477 -0.12517422  0.11128490  0.028863957
## 5 -0.20346063  0.14826514  0.04431887  0.06540897  0.09575112 -0.021845859
## 6  0.37811020  0.12997192  0.07302466 -0.33906972 -0.15699174  0.251559050
##           X198         X199       X200        X201        X202        X203
## 1 -0.001026839 -0.109367535 -0.2225502  0.01245910  0.08304803 -0.16532240
## 2 -0.170252760  0.014211359 -0.2872848 -0.11859348  0.04676875 -0.16191012
## 3 -0.049255576 -0.221797840 -0.2589406  0.00946888 -0.20863521  0.06007726
## 4  0.083063950 -0.290432500 -0.4372986 -0.08208907 -0.21667040  0.03928892
## 5  0.109488050 -0.264883460 -0.6165214  0.11145705  0.04875263  0.28323045
## 6  0.318532850  0.004148263 -0.1114905  0.07160963  0.01424022  0.22575597
##          X204        X205        X206        X207        X208        X209
## 1  0.28753900 -0.37563914  0.23024407 -0.03562003 -0.33761236 -0.18804020
## 2  0.13876185  0.05376970  0.05118274 -0.15927960 -0.01588179  0.07432910
## 3  0.03290672  0.09951092 -0.03822767 -0.18252840 -0.28835657  0.06027967
## 4 -0.18627144  0.08332904  0.07492258 -0.23383126 -0.41600380 -0.08407492
## 5 -0.01937772 -0.04458961  0.00855343 -0.09200495 -0.66255740  0.06839101
## 6  0.24290136 -0.16351415  0.23967549 -0.02327069 -0.11219372 -0.10214470
##         X210       X211        X212        X213        X214         X215
## 1 0.31371087 -0.1583320 -0.35140920 -0.30098712 -0.14440330  0.292379470
## 2 0.10763350 -0.1071177 -0.08368177 -0.08691478  0.07832102 -0.006445859
## 3 0.39991430 -0.5972207  0.14291449  0.01549724  0.10460801  0.107251674
## 4 0.29474208 -0.2751221  0.65838754  0.25398790  0.12835966  0.043866135
## 5 0.17592041 -0.2546875 -0.30601543  0.27161640  0.20186085  0.361964140
## 6 0.06059473 -0.4140534 -0.12636022 -0.30260766 -0.26940504  0.002813773
##          X216        X217        X218         X219         X220        X221
## 1  0.43658888 -0.04901969 -0.26521486  0.019232132  0.399637430 -0.03936071
```

```
## 2  0.09427576  0.08567833 -0.16462170  0.046688292 -0.007178426 -0.07764909
## 3 -0.10429516  0.10222864 -0.13523460  0.274213430  0.251872750  0.09955514
## 4 -0.19556555  0.21430705 -0.10276241  0.233367620  0.081869720  0.09147972
## 5 -0.26430100  0.06067117 -0.06871618  0.233016120  0.052960620  0.15843129
## 6 -0.16253613 -0.24368780 -0.25182053 -0.008699041  0.235300030 -0.33806880
##        X222       X223        X224         X225        X226       X227
## 1 0.2328928 -0.2897266  0.14603692 -0.086650275 -0.25467306 0.06628786
## 2 0.1584266 -0.6540977  0.05128452 -0.306058970 -0.19605868 0.19512542
## 3 0.2860389 -0.6343481 -0.17165612 -0.096478020 -0.33309606 0.44897413
## 4 0.4010880 -0.2399606 -0.18707949  0.254797800 -0.03430034 0.31794710
## 5 0.1199100 -0.3227675 -0.37569416 -0.007978584 -0.21385865 0.16548940
## 6 0.2449673 -0.3880011  0.27855050  0.065678210 -0.32141858 0.28911108
##           X228         X229        X230        X231        X232       X233
## 1  0.009125410 -0.095336100 -0.11533133 -0.22494718  0.03291914 0.16275479
## 2 -0.012097572 -0.319914580  0.00263913 -0.07636382 -0.04056317 0.06606353
## 3 -0.067875080  0.009743126 -0.18131150 -0.43401040 -0.19467698 0.09746674
## 4 -0.049416340 -0.024115052 -0.10633787 -0.37027153  0.05929866 0.27121780
## 5 -0.082409180 -0.213408200  0.03613602 -0.45584613 -0.21353425 0.25807342
## 6 -0.004155935  0.179814460  0.28061008 -0.02839342  0.21809201 0.32562402
##         X234        X235        X236        X237        X238        X239
## 1 -0.1577473  0.09298407 -0.02981915  0.01940747 -0.14619729 -0.01261792
## 2 -0.2391123 -0.08316444 -0.08467295 -0.07767836 -0.12193344 -0.02292583
## 3 -0.4168888 -0.04220274 -0.36881357 -0.28780600 -0.17804095 -0.17074166
## 4 -0.4720722  0.11693031 -0.09812263 -0.19056934  0.11503837 -0.20735316
## 5 -0.4486319  0.02920007 -0.09891724 -0.25663444  0.01296056  0.05065835
## 6  0.1254496  0.03925937 -0.29441297  0.40672868 -0.10262644 -0.18357061
##          X240         X241        X242        X243         X244        X245
## 1 -0.20750257 -0.249791560 -0.12010664 -0.08459544 -0.176224700 -0.36271970
## 2  0.05462621 -0.037153420 -0.02818135  0.10894874  0.005074762 -0.08233880
## 3 -0.24006840 -0.277456880  0.02517675  0.20274597  0.187556860  0.07220479
## 4 -0.31421733 -0.285059450  0.25779760 -0.06338455  0.160859610  0.05798380
## 5 -0.22147736 -0.263592120 -0.20185839  0.32200086  0.011482902  0.20683318
## 6 -0.11417718 -0.009765407  0.07850803  0.14735780 -0.060032490  0.17451908
##         X246      X247         X248       X249        X250        X251
## 1 -0.3474837 0.4396165 -0.250508130 0.06626445 -0.07372804 -0.27917635
## 2 -0.2138520 0.3852618 -0.247335720 0.52223307 -0.15473336 -0.12276128
## 3 -0.1412588 0.4618883 -0.079024470 0.56617266 -0.32420623 -0.12875639
## 4 -0.1439508 0.2315406  0.109090250 0.11287652 -0.24632253 -0.15640910
## 5  0.2228567 0.5481906  0.370208000 0.21199164 -0.37562400 -0.03718609
## 6 -0.4626457 0.3674672  0.007582737 0.09803680 -0.10472117 -0.18678223
##          X252         X253        X254         X255        X256        X257
## 1  0.04891941  0.019303128 -0.36622990  0.227423890 -0.27978998 -0.04844415
## 2  0.01167572  0.012793078  0.07659441 -0.001855513 -0.13591422  0.34589600
## 3 -0.25149164  0.010381632 -0.51347110  0.032044373 -0.01489544  0.29160714
## 4 -0.38530758  0.038406240 -0.53427273  0.116035600  0.11466099  0.19875416
## 5  0.14670801 -0.015489628 -0.09131973 -0.076476140 -0.20513336  0.09639776
## 6 -0.06991669 -0.007246775  0.12023344  0.413038130  0.10283223  0.03074469
##          X258        X259      X260         X261        X262        X263
## 1 -0.27474093 -0.08863648 0.4923174 -0.091491580 -0.55696850  0.15258238
## 2 -0.06543445 -0.02852708 0.3138412  0.005989261 -0.23266204  0.01278037
## 3 -0.22402498 -0.47876924 0.3034157 -0.174534720 -0.14114714 -0.12743498
## 4 -0.05671836 -0.38956267 0.1400722  0.000393416  0.09798099 -0.24569897
## 5 -0.06132543 -0.09994126 0.1722290 -0.118548565 -0.12797640 -0.26940605
## 6  0.13378651  0.13570933 0.3728803  0.192830620 -0.25542447 -0.20452605
```

```
##          X264         X265        X266      X267        X268        X269
## 1  0.22723620  0.047296360  0.03777911 0.1021252  0.08917377  0.18320873
## 2  0.32625186  0.068292930 -0.07912376 0.4202766  0.02905514 -0.01447288
## 3  0.31296557  0.002224314  0.09450821 0.5365813 -0.21820231 -0.09134804
## 4  0.03555339 -0.105802834 -0.03294069 0.4552424 -0.07953740 -0.07168483
## 5  0.17209810  0.018968843 -0.24674992 0.2854451 -0.15615045 -0.25075784
## 6 -0.01332169  0.103204030 -0.09526886 0.3746913 -0.04751929 -0.11190992
##          X270       X271        X272        X273        X274         X275
## 1  0.15654585 -0.1499869 -0.22383201 -0.34238324  0.40297803 -0.133566230
## 2 -0.18000962 -0.2370202 -0.03287778 -0.17744550  0.24356888 -0.228184790
## 3 -0.08563096 -0.1438107 -0.32098820  0.05086004 -0.05641183 -0.340582940
## 4 -0.11316276 -0.2451500 -0.13510320  0.30941364 -0.07572503 -0.149168310
## 5  0.01975317 -0.1532024 -0.04846752  0.20188378 -0.05405645 -0.113221355
## 6  0.03705194 -0.1391767 -0.03591009 -0.17221928  0.37328140  0.005774962
##        X276        X277        X278        X279        X280        X281
## 1 0.1230013  0.10894274  0.44801095  0.26090938 -0.03062845  0.07029194
## 2 0.1518698 -0.22744925 -0.06707738  0.06912960  0.06008390 -0.22510664
## 3 0.1734722  0.00369754  0.10416457 -0.10270592  0.28316048  0.07522166
## 4 0.1350561  0.24802405 -0.06726912 -0.11683456  0.21722907  0.23568027
## 5 0.3275076  0.10677812  0.01674901 -0.06682326  0.17737103  0.75085270
## 6 0.2799568  0.06543998  0.30005538  0.46010366 -0.16525010  0.02038636
##          X282        X283       X284        X285        X286        X287
## 1  0.05599202  0.13128878 0.30965513  0.05133245  0.07200967 0.158545960
## 2  0.03476552  0.21450576 0.18567912  0.01475821 -0.07051003 0.185279770
## 3 -0.43320683  0.20971571 0.34387383 -0.25124446  0.05295736 0.110491770
## 4 -0.05238910  0.06975254 0.23956272 -0.17436938 -0.08903540 0.002778950
## 5  0.05718695 -0.09480550 0.41533700  0.02560427 -0.28287005 0.009337672
## 6  0.21839337  0.03122385 0.03677826 -0.26076150 -0.22533481 0.174768220
##          X288        X289          X290       X291       X292         X293
## 1  0.12478771 -0.05030283 -0.1744324300  0.2355763 0.18841693  0.095850170
## 2 -0.08372230  0.05627263 -0.0001537617  0.3102088 0.08275127  0.065967260
## 3  0.06493770 -0.06645308  0.2771368600  0.2216559 0.41141325 -0.043637615
## 4  0.09597004  0.10117406  0.5804598300 -0.1396173 0.30341816 -0.006686681
## 5 -0.11460640 -0.12092313  0.2925460000  0.2083435 0.13608679  0.023950122
## 6  0.14580010  0.36671516 -0.0282308250  0.4526211 0.60091460  0.284186360
##          X294        X295        X296       X297         X298       X299
## 1  0.05958545 -0.26181397 -0.12942682  0.1106530  0.111098660 0.04712391
## 2 -0.12667632  0.10647926  0.20570675 -0.1185442 -0.025972893 0.21868058
## 3 -0.12639478  0.27183574  0.36764577 -0.5079815 -0.134483500 0.12644708
## 4 -0.17932889  0.13940029  0.23461391 -0.4709817 -0.132262950 0.34416717
## 5  0.07003969  0.05062050  0.22549320 -0.4334845 -0.227295250 0.03496791
## 6 -0.32252946 -0.02636443 -0.02568395 -0.5449139  0.001921349 0.17711720
##          X300        X301        X302        X303         X304        X305
## 1  0.08990387 -0.06111330 -0.01124704  0.05479610 -0.190887210 -0.02162724
## 2 -0.04925900 -0.06926133 -0.20349246 -0.05635802 -0.121154375 -0.11133145
## 3  0.07373585  0.01449330 -0.16972028 -0.06998153 -0.115958190  0.05582814
## 4 -0.07534424  0.28456753  0.11769196  0.05158312  0.002276873  0.34534612
## 5 -0.07465985 -0.05708794 -0.12490057  0.16176037  0.010797251  0.36599636
## 6 -0.08354086 -0.16851516  0.18554412 -0.07663448  0.072129570  0.03811707
##         X306        X307        X308        X309        X310        X311
## 1 0.26825586  0.14959294 0.003617788 -0.42931880  0.15043205 -0.37504563
## 2 0.03114838  0.03721712 0.303255100 -0.04098415 -0.01045364  0.13655819
## 3 0.42169747 -0.21300146 0.178850020 -0.56118840 -0.18253075 -0.01390608
## 4 0.38116553 -0.34837744 0.166838740 -0.45003930  0.02532300  0.06130882
```

```
## 5 0.14306547 -0.03593042 0.169301210 -0.35818785  0.23250537 -0.32952026
## 6 0.13763840  0.22003089 0.115806550 -0.23842824 -0.02690947  0.03253251
##         X312         X313        X314       X315        X316         X317
## 1 0.02789153  0.241601210  0.21493769 0.24440613 -0.42065617 -0.086467475
## 2 0.01823851  0.059292722  0.08884950 0.25151467  0.02146947  0.103465720
## 3 0.31121963 -0.087298460  0.02600313 0.06498746 -0.22674258  0.001650792
## 4 0.13149590  0.007515826  0.03898556 0.05628781 -0.26575595  0.146196620
## 5 0.08163007 -0.154201420 -0.06255034 0.05398887 -0.18597327  0.492797730
## 6 0.16116643  0.095734620 -0.04492413 0.13831733 -0.22790310  0.084574660
##          X318       X319         X320        X321        X322        X323
## 1 -0.17332317 -0.4764731 -0.111852735  0.10149532 -0.02073869  0.36234817
## 2  0.18639573 -0.8095084  0.046272807 -0.06979964 -0.46546290  0.14244660
## 3 -0.10471823 -0.8805178 -0.060743716  0.40926160 -0.27070823 -0.14667453
## 4 -0.25226050 -0.5078095 -0.131631360  0.44533935 -0.16172437 -0.10892484
## 5 -0.20555784 -0.4739399 -0.004465971  0.15549606 -0.11687715  0.05189369
## 6 -0.06157368 -0.4749866 -0.063617710  0.09550637 -0.07704561  0.03434662
##         X324         X325        X326        X327        X328         X329
## 1 0.06934232  0.161212580  0.14933090 -0.23701346  0.11946166 -0.354803560
## 2 0.11925222  0.135007460 -0.10524715 -0.26256004  0.01029534  0.042808670
## 3 0.08631313 -0.005369183  0.09240440  0.04822368 -0.01293436 -0.378499950
## 4 0.06872611 -0.076837600 -0.05202009  0.23586749  0.08033565 -0.008865438
## 5 0.04211814 -0.173468560 -0.15015069  0.08924362  0.34655940 -0.016676258
## 6 0.12494963  0.267011880  0.30707020 -0.36884955 -0.23858562  0.205878110
##          X330        X331        X332        X333        X334          X335
## 1 -0.02358162 -0.06978546  0.12975222  0.16794725  0.29827250  0.0004056135
## 2 -0.13053603  0.17137514 -0.18212008  0.08917274  0.15613817  0.1643371400
## 3  0.19485725 -0.01450265  0.01438312  0.04981846  0.23257495  0.3486512300
## 4  0.52171713 -0.10982202 -0.03766324  0.21146667  0.19236839  0.1456411300
## 5  0.05101300 -0.34187573  0.29139840 -0.18924575 -0.01817033 -0.0433402200
## 6 -0.07757715  0.07498973 -0.35873792 -0.12468971  0.27267110  0.2442977700
##           X336         X337          X338       X339      X340       X341
## 1  0.177666600 -0.098660530 -0.0219108180  0.2629319 0.1494135 0.24968462
## 2 -0.152574720  0.010509073  0.0364773120 -0.2235032 0.1181459 0.22427106
## 3 -0.096260330 -0.029991418  0.1956212200  0.3341183 0.4134726 0.40476590
## 4 -0.150278570 -0.003214074  0.1551904200  0.4696210 0.1663639 0.42412466
## 5 -0.003126342 -0.058145925  0.0005654864  0.1906268 0.3927596 0.03533957
## 6  0.065145950  0.265352430 -0.1594228600  0.1106320 0.1829114 0.35314170
##          X342        X343       X344       X345       X346         X347
## 1  0.09267649 -0.03983721  0.3555983 0.08908885  0.1082202  0.239273600
## 2  0.14711341  0.02685771 -0.0742145 0.21387526 -0.1687383 -0.116996200
## 3 -0.17567204  0.29711533  0.1489908 0.58919495  0.2463056 -0.181071980
## 4 -0.19775657  0.33431667  0.1310592 0.28344685  0.4131224  0.235679730
## 5  0.07842728  0.35642666  0.1408707 0.37270950  0.3489954  0.007734960
## 6 -0.37739670 -0.19648111  0.2608737 0.10371717  0.3440046 -0.002148003
##          X348        X349        X350      X351        X352        X353
## 1  0.10781701  0.11976284 -0.07546131 -1.123180 -0.08830957 -0.18401437
## 2  0.12769951  0.06184119  0.11835110 -1.053988 -0.28272936  0.08813658
## 3  0.06491380 -0.12289578  0.08893049 -1.935510 -0.03308295  0.23001614
## 4 -0.15273891 -0.08928406 -0.03458375 -2.098822  0.09655976  0.37082043
## 5  0.28381008 -0.13170223  0.05475353 -1.959567 -0.12873219  0.25097390
## 6 -0.08568027 -0.12097745  0.09624431 -1.701305 -0.30736130 -0.21666926
##          X354       X355        X356        X357        X358        X359
## 1 -0.13502572 0.14387232 -0.11910473  0.12501182 -0.08796709 -0.12611572
## 2 -0.09558823 0.23869020  0.15476526  0.02169239  0.19729339  0.09235955
```

```
## 3 -0.35671797 0.55488616  0.16232769  0.17087357 -0.12052818 -0.10229787
## 4 -0.28467366 0.35571140 -0.02972367  0.11018293  0.01188009 -0.19310420
## 5 -0.22365108 0.61613774  0.18926308  0.28541413  0.22185590  0.17309481
## 6 -0.13801499 0.04958088 -0.10744368 -0.04950230 -0.05193848 -0.20645976
##         X360        X361        X362       X363        X364         X365
## 1 0.04298443  0.60177237  0.14368924 -0.1027599 -0.10326459  0.004502531
## 2 0.14574647  0.06386233 -0.02113802  0.2383660  0.03158547  0.088461180
## 3 0.28332368 -0.16265537  0.03687236  0.1450864 -0.30318790 -0.152575630
## 4 0.24109808 -0.11365142 -0.03473418  0.0308506 -0.13431473 -0.135689440
## 5 0.05226219 -0.05389039  0.20130298  0.2367635 -0.03183036 -0.009483949
## 6 0.08130291  0.56563133  0.13576318  0.2694787 -0.25842760  0.026112134
##         X366        X367        X368        X369        X370        X371
## 1 -0.3908216  0.02699675  0.29327030  0.05766370 -0.07308041 -0.23861833
## 2 -0.1845963 -0.01466343 -0.04143428  0.12504807 -0.01165735  0.27516450
## 3 -0.3777711 -0.09176481 -0.22883100  0.35586113  0.05467660  0.09507194
## 4 -0.5997052 -0.13190414 -0.13815361  0.31029332  0.11012910  0.13044043
## 5 -0.1482956 -0.21557209 -0.09670579  0.11201896  0.06678737 -0.18813080
## 6 -0.1903244 -0.20323184  0.17126545 -0.05269674 -0.02176836  0.28437987
##          X372        X373       X374        X375        X376        X377
## 1  0.31085443 -0.27022990 0.08762686 -0.02887934  0.13095675 -0.06682418
## 2  0.15532768  0.12500520 0.12617620 -0.08837882  0.02815210 -0.05813534
## 3  0.03749319  0.01826829 0.39337670 -0.14433130  0.08852126 -0.08399173
## 4 -0.12060653 -0.10266505 0.33093223 -0.18540803 -0.16203120 -0.12169313
## 5 -0.17039673  0.14171405 0.29394385 -0.23836400 -0.00113312  0.07318302
## 6  0.13520524  0.02522874 0.12932384 -0.02199030 -0.02264631  0.06566036
##          X378        X379        X380        X381        X382        X383
## 1 -0.38795730  0.11613764 -0.24011247 -0.28759685 -0.30549240  0.03368242
## 2 -0.28581360  0.19168624  0.13777850 -0.06586509 -0.06349335  0.29464600
## 3 -0.40614054 -0.09950261  0.05392457  0.10187504 -0.09481762  0.03841895
## 4 -0.45923440 -0.14814900  0.03866845 -0.02191722 -0.07997540 -0.32813367
## 5 -0.34010348  0.01032152  0.18441217  0.04591248 -0.19427246  0.16637954
## 6 -0.01336716  0.33994144  0.13124946 -0.16348755 -0.10327753 -0.08101543
```

```r
set.seed(123)
# 1) Regression with mean_valence_macro as the independent variable
# and intendedVote as the dependent variable using basic logistic regression.
model1 <- glm(intendedVote ~ mean_valence_macro,
              data = climateact,
              family = binomial(link = "logit"))

summary(model1)
```

```
##
## Call:
## glm(formula = intendedVote ~ mean_valence_macro, family = binomial(link = "logit"),
##     data = climateact)
##
## Coefficients:
##                    Estimate Std. Error z value Pr(>|z|)
## (Intercept)         0.79732    0.02925   27.26   <2e-16 ***
## mean_valence_macro  1.14360    0.04011   28.51   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 8199.2  on 6676  degrees of freedom
## Residual deviance: 7032.5  on 6675  degrees of freedom
## AIC: 7036.5
##
## Number of Fisher Scoring iterations: 4
```

```
# Continue with the regularized regressions for model2 and model3...

# Extract embeddings for model2 and model3 from word+comment
embedding_cols <- paste("X", 0:383, sep = "")
X2 <- as.matrix(climateact[, embedding_cols])
Y <- climateact$intendedVote

# 2) Regression with the embeddings as independent variables and
# intendedVote as the dependent variable using Elastic Net.
model2 <- glmnet(X2, Y, family = "binomial", alpha = 0.5)
cv.model2 <- cv.glmnet(X2, Y, family = "binomial", alpha = 0.5)
print(cv.model2)
```

```
##
## Call:  cv.glmnet(x = X2, y = Y, family = "binomial", alpha = 0.5)
##
## Measure: Binomial Deviance
##
##       Lambda Index Measure       SE Nonzero
## min 0.007913    28   1.191 0.006922     100
## 1se 0.022018    17   1.197 0.006776      38
```

```
# 3) Regression with the embeddings as independent variables and mean_valence_macro,
# with intendedVote as the dependent variable using Elastic Net.
X3 <- as.matrix(climateact[, c("mean_valence_macro",embedding_cols)])
model3 <- glmnet(X3, Y, family = "binomial", alpha = 0.5)
cv.model3 <- cv.glmnet(X3, Y, family = "binomial", alpha = 0.5)
print(cv.model3)
```

```
##
## Call:  cv.glmnet(x = X3, y = Y, family = "binomial", alpha = 0.5)
##
## Measure: Binomial Deviance
##
##      Lambda Index Measure      SE Nonzero
## min 0.00981    40   1.045 0.01303      69
## 1se 0.03610    26   1.058 0.01179      11
```

```
# Extract embeddings for model4 and model5 from "word" embeddings
embedding_cols <- paste("X", 0:383, sep = "")
X4 <- as.matrix(climateact_word[, embedding_cols])
Y2 <- climateact_word$intendedVote

# 2) Regression with the embeddings as independent variables and
```

```r
# intendedVote as the dependent variable using Elastic Net.
model4 <- glmnet(X4, Y, family = "binomial", alpha = 0.5)
cv.model4 <- cv.glmnet(X4, Y, family = "binomial", alpha = 0.5)
print(cv.model4)
```

```
##
## Call:  cv.glmnet(x = X4, y = Y, family = "binomial", alpha = 0.5)
##
## Measure: Binomial Deviance
##
##      Lambda Index Measure       SE Nonzero
## min 0.01046    25   1.191 0.009361      83
## 1se 0.02652    15   1.199 0.008517      30
```

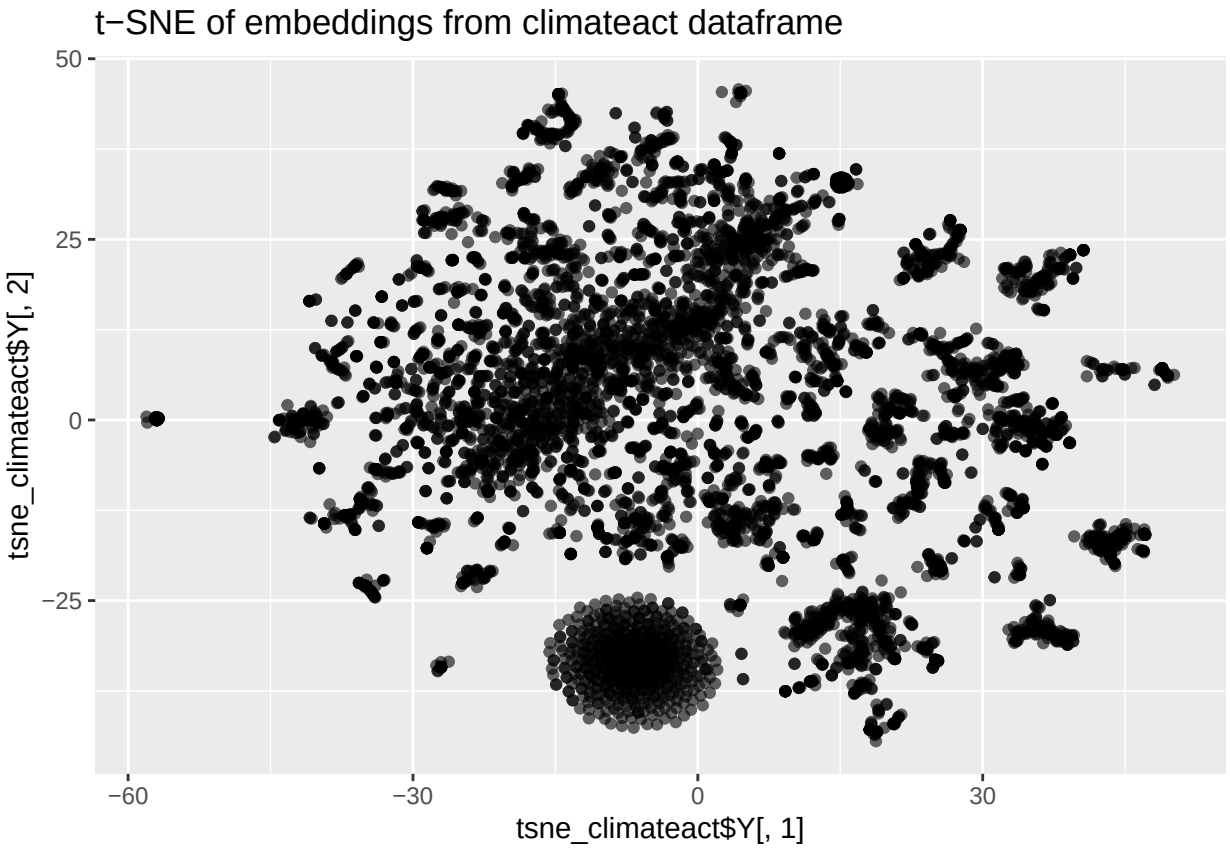
```r
# 3) Regression with the embeddings as independent variables and mean_valence_macro,
# with intendedVote as the dependent variable using Elastic Net.
X5 <- as.matrix(climateact_word[, c("mean_valence_macro.x",embedding_cols)])
model5 <- glmnet(X5, Y, family = "binomial", alpha = 0.5)
cv.model5 <- cv.glmnet(X5, Y, family = "binomial", alpha = 0.5)
print(cv.model5)
```

```
##
## Call:  cv.glmnet(x = X5, y = Y, family = "binomial", alpha = 0.5)
##
## Measure: Binomial Deviance
##
##      Lambda Index Measure      SE Nonzero
## min 0.01077    39   1.045 0.01561      62
## 1se 0.03962    25   1.060 0.01409       6
```

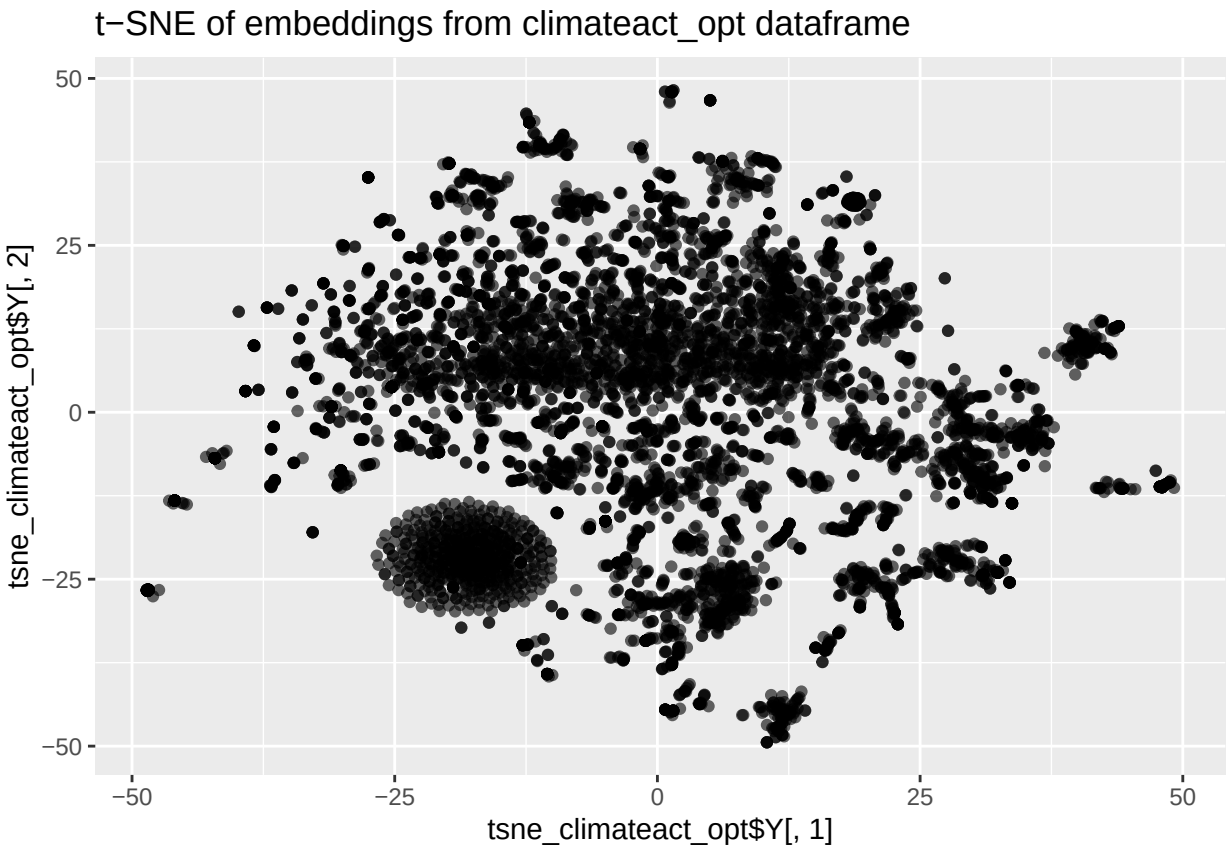
```r
# 1. Extract the nonzero coefficients at lambda.min from model2
coefficients_model2 <- coef(model2, s = cv.model2$lambda.min)

# 2. Identify the embedding columns that correspond to these nonzero coefficients
nonzero_coeff_names <- rownames(coefficients_model2)[coefficients_model2[, 1] != 0]
nonzero_embedding_cols <- nonzero_coeff_names[nonzero_coeff_names %in% embedding_cols]

# 3. Create climateact_opt by selecting only these columns
# (along with other columns from climateact that aren't embeddings)
non_embedding_cols <- setdiff(colnames(climateact), embedding_cols)
all_relevant_cols <- c(non_embedding_cols, nonzero_embedding_cols)

climateact_opt <- climateact[, all_relevant_cols]
```

```r
#Visualize the embeddings from climateact and from climateact_opt
# 1. Visualize all embeddings from the climateact dataframe

# Extract the embeddings from the climateact dataframe
embeddings_climateact <- as.matrix(climateact[, embedding_cols])

# Perform t-SNE
set.seed(123) # for reproducibility
```

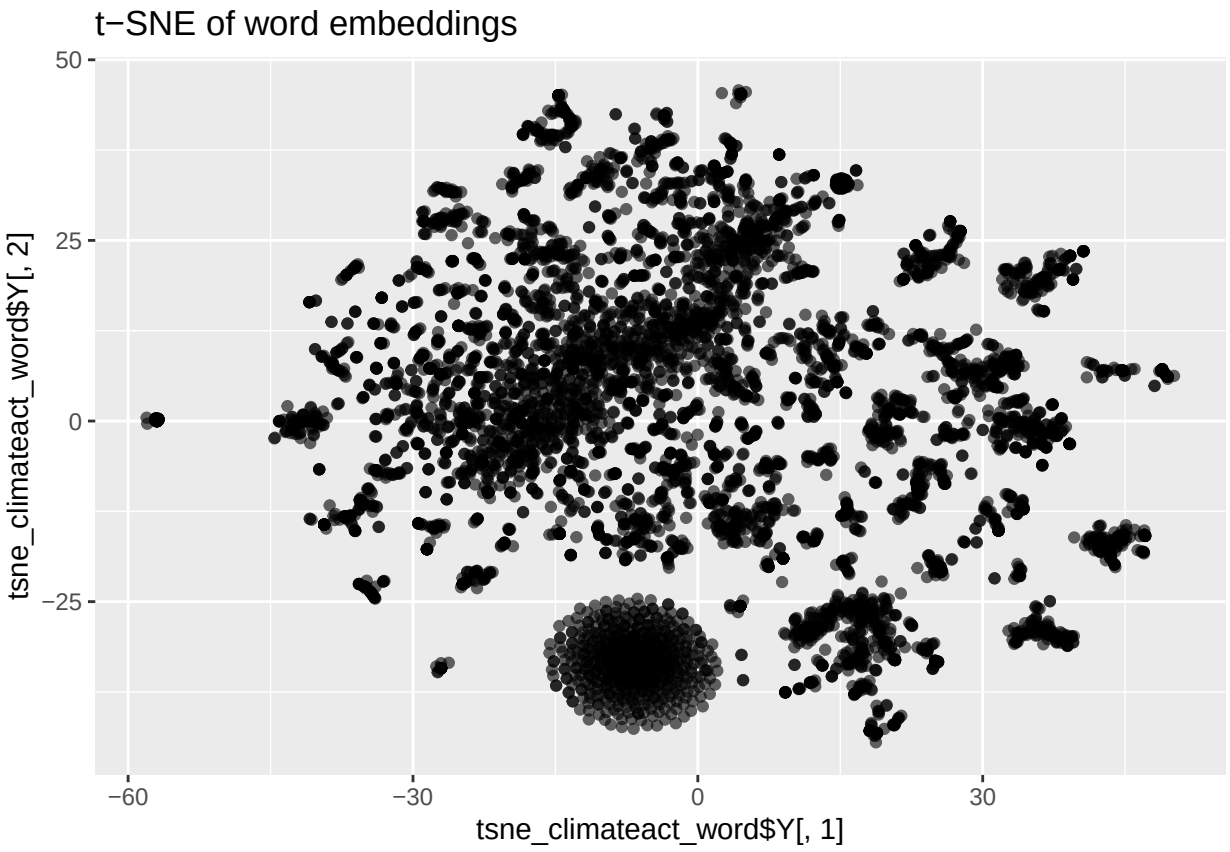
```r
tsne_climateact <- Rtsne(embeddings_climateact, is_distance = FALSE, perplexity = 30, check_duplicates =

# Plot t-SNE results
plot1 <- ggplot(NULL, aes(x = tsne_climateact$Y[, 1], y = tsne_climateact$Y[, 2])) +
  geom_point(alpha = 0.6) +
  labs(title = "t-SNE of embeddings from climateact dataframe")

print(plot1)
```




```r
# 2. Visualize embeddings from the climateact_opt dataframe

# Extract the embeddings from the climateact_opt dataframe
embeddings_climateact_opt <- as.matrix(climateact_opt[, nonzero_embedding_cols])

# Perform t-SNE
set.seed(123) # for reproducibility
tsne_climateact_opt <- Rtsne(embeddings_climateact_opt, is_distance = FALSE, perplexity = 30, check_dupl

# Plot t-SNE results
plot2 <- ggplot(NULL, aes(x = tsne_climateact_opt$Y[, 1], y = tsne_climateact_opt$Y[, 2])) +
  geom_point(alpha = 0.6) +
  labs(title = "t-SNE of embeddings from climateact_opt dataframe")

print(plot2)
```



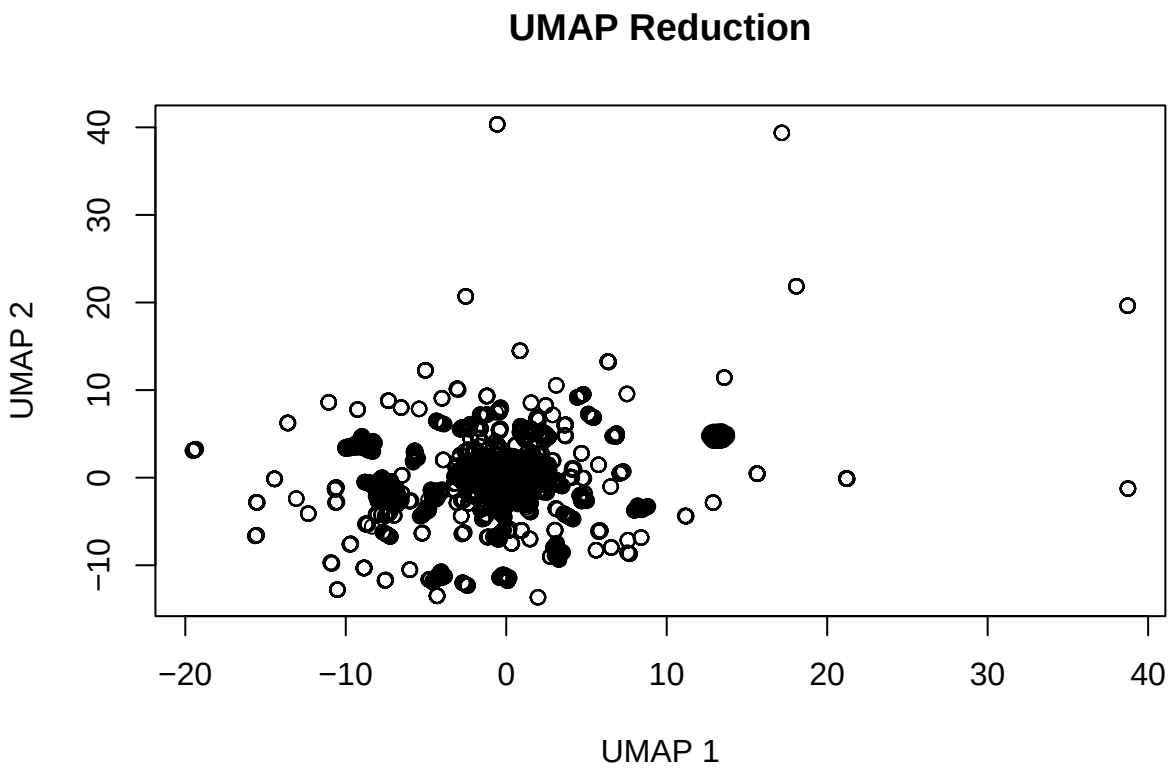

```
#3 Visualize word embeddings
embeddings_climateact_word <- as.matrix(climateact_word[, embedding_cols])
# Perform t-SNE
set.seed(123) # for reproducibility
tsne_climateact_word <- Rtsne(embeddings_climateact_word, is_distance = FALSE, perplexity = 30, check_du

# Plot t-SNE results
plot3 <- ggplot(NULL, aes(x = tsne_climateact_word$Y[, 1], y = tsne_climateact_word$Y[, 2])) +
  geom_point(alpha = 0.6) +
  labs(title = "t-SNE of word embeddings")

print(plot3)
```




```
#First clustering approach: UMAP Dimensionality reduction
#Dimensionality Reduction 2 Dimensions
#First scale the embeddings
scaled_embeddings_word <- scale(embeddings_climateact_word)
#Change Arguments of umap
custom.settings <- umap.defaults
custom.settings$random_state = 26 #set seed for reproducibility
custom.settings$transform_state = 26 #set seed for reproducibility
custom.settings$n_neighbors = 8

#Perform dimensionality reduction on embeddings with umap
umap_result_2 <- umap::umap(scaled_embeddings_word,custom.settings)
```

```
## Warning: failed creating initial embedding; using random embedding instead
```

```
#Visualize the results
plot(umap_result_2$layout[,1],umap_result_2$layout[,2], main = "UMAP Reduction", xlab="UMAP 1", ylab =
```




```
#Cluster umap results
db_result_umap <- dbscan::dbscan(umap_result_2$layout, eps = 12, minPts = 5)

# Count of data points in each cluster
cluster_counts_umap <- table(db_result_umap$cluster)

# Display the clustering results
print(cluster_counts_umap)
```

```
##
##    1    2    3    4    5
## 6645    5   10    9    8
```

```
# Number of clusters (excluding noise)
num_clusters_umap <- length(unique(db_result_umap$cluster)) - 1  # Subtracting 1 to exclude noise
cat("Number of clusters:", num_clusters_umap, "\n")
```

```
## Number of clusters: 4
```

```
# Number of noise points
num_noise_umap <- sum(db_result_umap$cluster == 0)
cat("Number of noise points:", num_noise_umap, "\n")
```

```
## Number of noise points: 0
```

```r
#Cluster raw set
db_result_nored <- dbscan::dbscan(embeddings_climateact_word, eps = 12, minPts = 5)

# Count of data points in each cluster
cluster_counts_nored <- table(db_result_nored$cluster)

# Display the clustering results
print(cluster_counts_nored)
```

```
##
##    1
## 6677
```

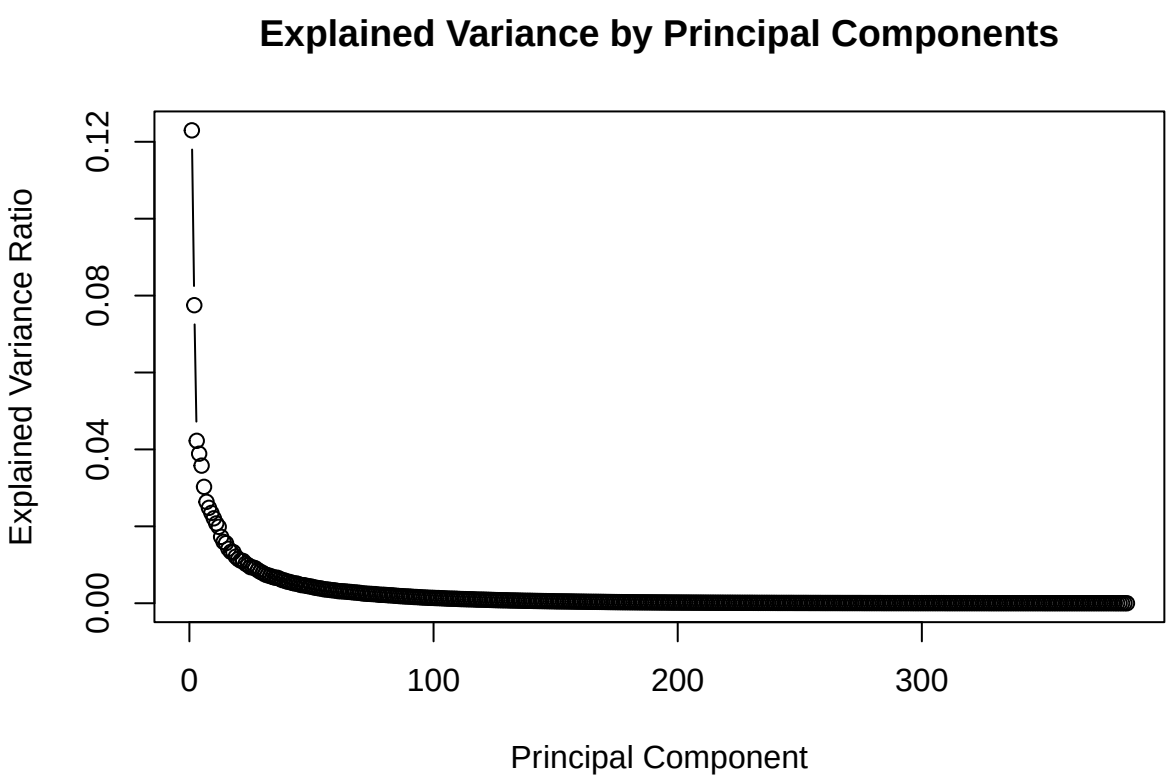
```r
# Number of clusters (excluding noise)
num_clusters_nored <- length(unique(db_result_nored$cluster)) - 1  # Subtracting 1 to exclude noise
cat("Number of clusters:", num_clusters_nored, "\n")
```

```
## Number of clusters: 0
```

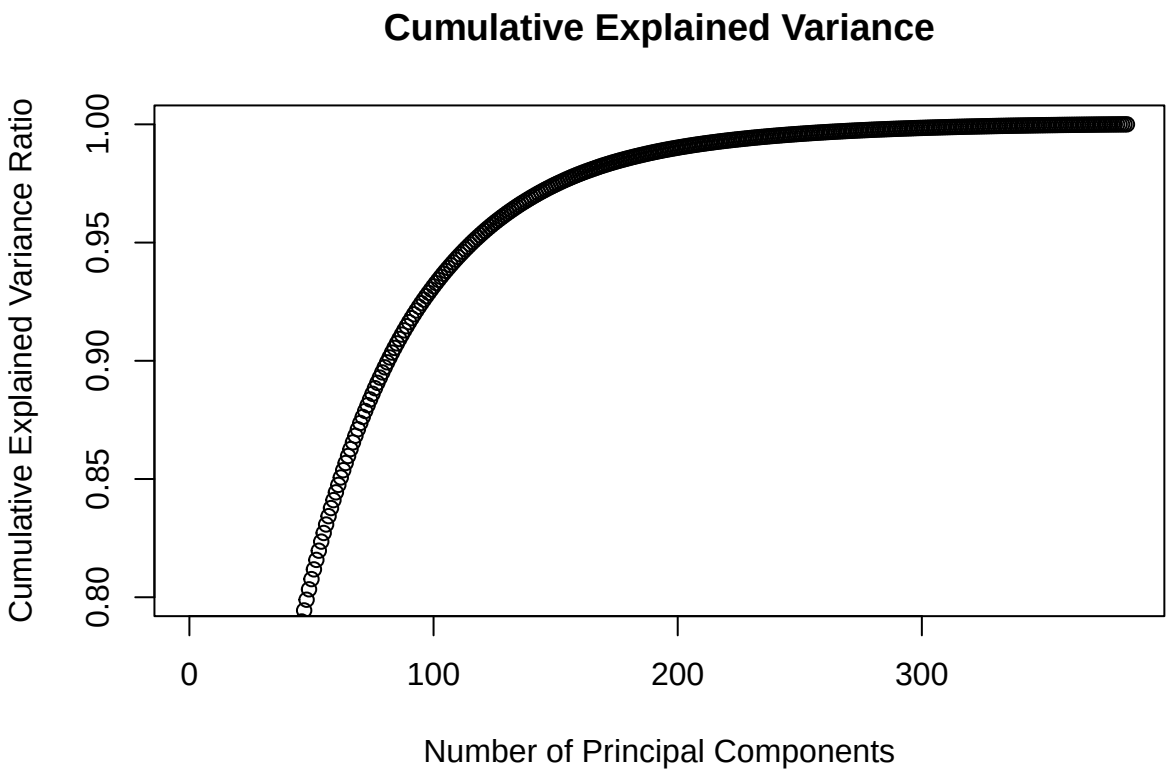
```r
# Number of noise points
num_noise_nored <- sum(db_result_nored$cluster == 0)
cat("Number of noise points:", num_noise_nored, "\n")
```

```
## Number of noise points: 0
```

```r
#Principal Component Analysis to reduce to important dimensions
# Loading required library
library(stats)
set.seed(123)
# Scaling the embeddings
scaled_embeddings_word <- scale(embeddings_climateact_word)

# Applying PCA
pca_result <- prcomp(scaled_embeddings_word, center = TRUE, scale. = TRUE)

# Plotting the variance explained by each principal component
explained_variance_ratio <- pca_result$sdev^2 / sum(pca_result$sdev^2)
cum_explained_variance <- cumsum(explained_variance_ratio)
plot(explained_variance_ratio, type = "b", main="Explained Variance by Principal Components",
     xlab = "Principal Component", ylab = "Explained Variance Ratio")
```




```
plot(cum_explained_variance, type = "b", main="Cumulative Explained Variance",
     xlab = "Number of Principal Components", ylab = "Cumulative Explained Variance Ratio",
     ylim=c(0.8,1), yaxp=c(0.8,1,4))  # Here, it's divided into 0.8, 0.85, 0.9, 0.95, 1
```




```r
#By inspecting the Cumulative graph, choose what number of components explain 95% of variance
```

```r
# Project the data onto the first 100 principal components
pca_transformed_data <- pca_result$x[, 1:100]
```

```r
# Apply DBSCAN on PCA reduced set
db_result <- dbscan::dbscan(pca_transformed_data, eps = 15, minPts = 5)

# Count of data points in each cluster
cluster_counts <- table(db_result$cluster)

# Display the clustering results
print(cluster_counts)
```

```
##
##    0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
##  746 5834    7    7    6    5    9    8   11    7    5    5    6    5    8    2
##   16
##    6
```

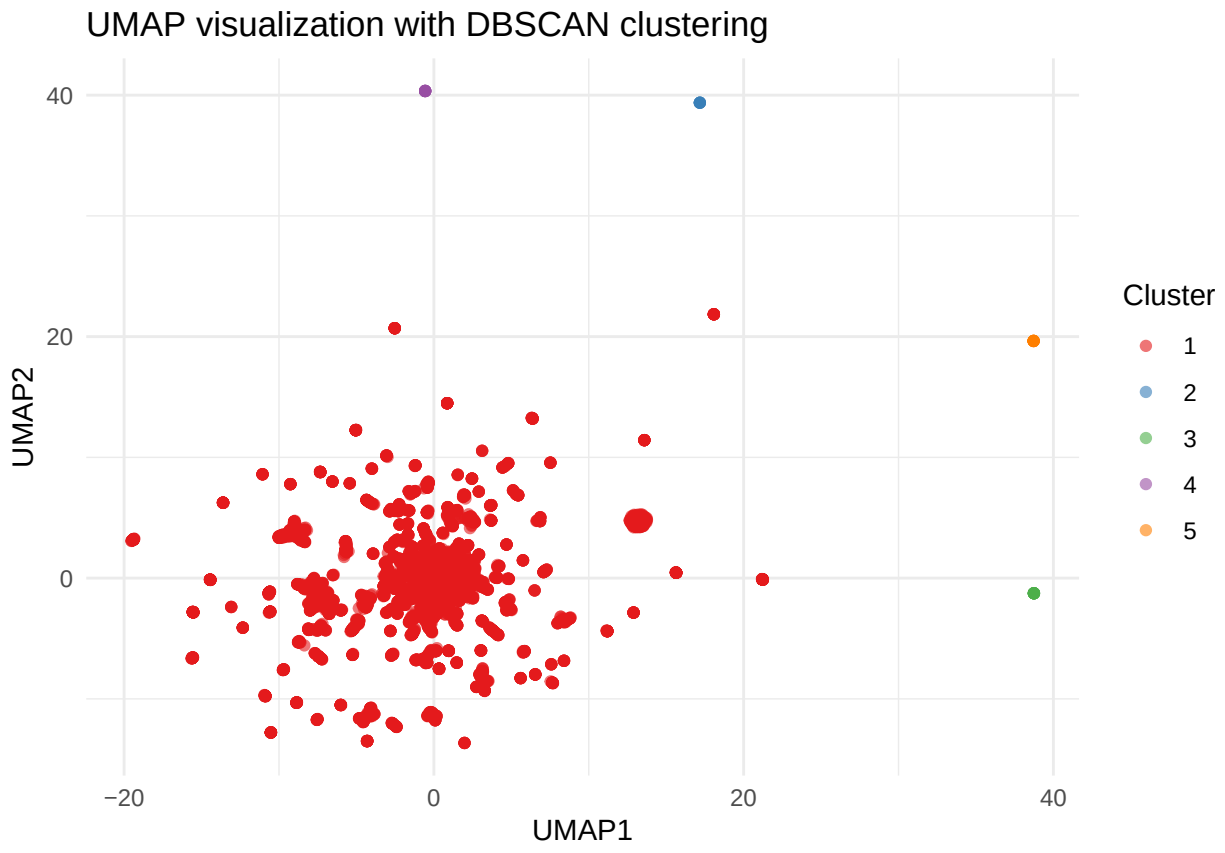
```r
# Number of clusters (excluding noise)
num_clusters <- length(unique(db_result$cluster)) - 1  # Subtracting 1 to exclude noise
cat("Number of clusters:", num_clusters, "\n")
```

```
## Number of clusters: 16
```

```r
# Number of noise points
num_noise <- sum(db_result$cluster == 0)
cat("Number of noise points:", num_noise, "\n")
```

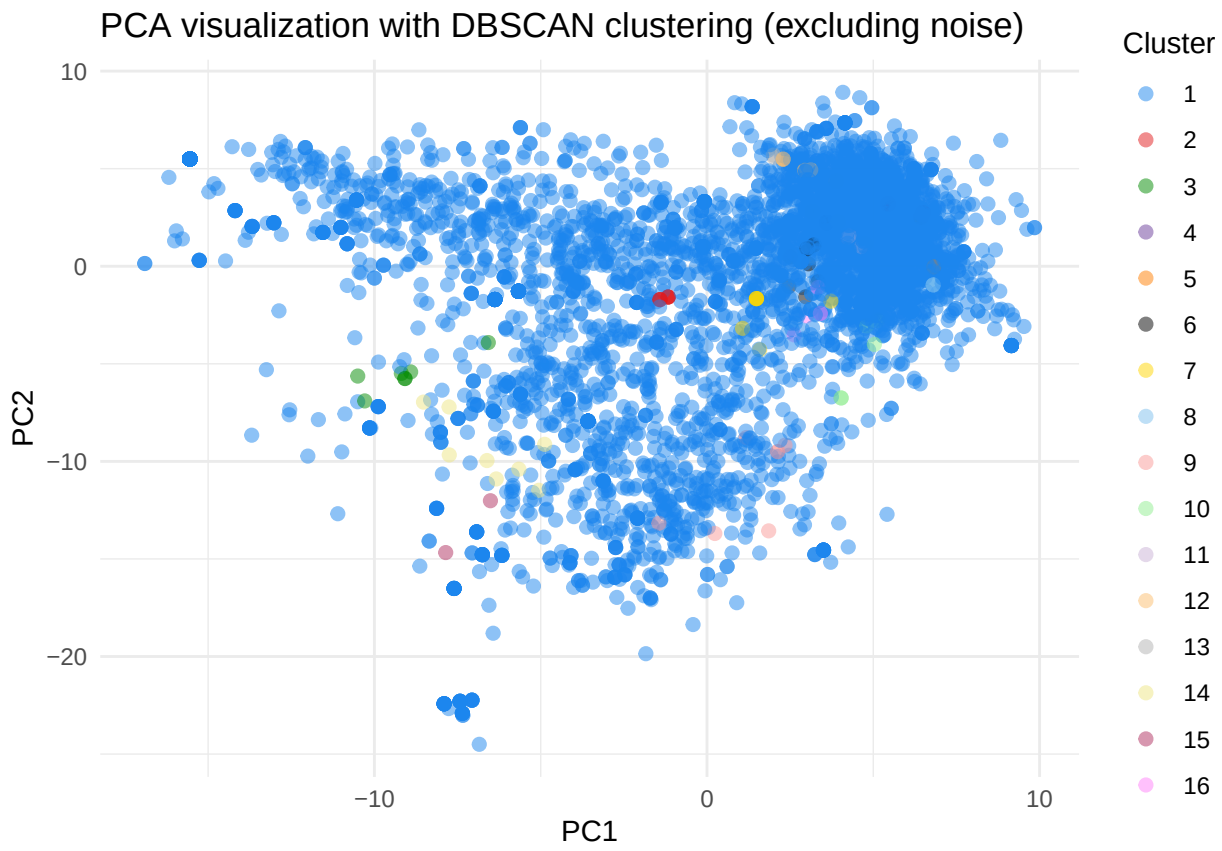
```
## Number of noise points: 746
```

```r
#Visualize the umap reduced clusters
# Create a dataframe for plotting
plot_df_umap <- data.frame(umap_result_2$layout)
colnames(plot_df_umap) <- c("UMAP1", "UMAP2")
plot_df_umap$cluster <- as.factor(db_result_umap$cluster)

# Plot the UMAP results colored by cluster assignment
ggplot(plot_df_umap, aes(x = UMAP1, y = UMAP2, color = cluster)) +
  geom_point(alpha = 0.6) +
  scale_color_brewer(palette = "Set1", na.value = "grey50") +
  labs(title = "UMAP visualization with DBSCAN clustering", color = "Cluster") +
  theme_minimal()
```




```r
#Visualize the PCA reduced clusters
# Create a dataframe for plotting
plot_data <- data.frame(pca_transformed_data, Cluster = as.factor(db_result$cluster))

# Filter out the noise cluster
```

```r
plot_data_filtered <- plot_data %>% filter(Cluster != 0)

#Create color palette
col25 <- c(
  "dodgerblue2", "#E31A1C", # red
  "green4",
  "#6A3D9A", # purple
  "#FF7F00", # orange
  "black", "gold1",
  "skyblue2", "#FB9A99", # lt pink
  "palegreen2",
  "#CAB2D6", # lt purple
  "#FDBF6F", # lt orange
  "gray70", "khaki2",
  "maroon", "orchid1", "deeppink1", "blue1", "steelblue4",
  "darkturquoise", "green1", "yellow4", "yellow3",
  "darkorange4", "brown"
)

# Add cluster assignment to the dataframe
plot_data_filtered$Cluster <- db_result$cluster[db_result$cluster != 0]

# Visualize the clusters using ggplot2 with jitter
ggplot(plot_data_filtered, aes(x = PC1, y = PC2, color = as.factor(Cluster))) +
  geom_point(size = 2, alpha = 0.5) +
  scale_color_manual(values = col25) +
  labs(title = "PCA visualization with DBSCAN clustering (excluding noise)",
       x = "PC1",
       y = "PC2",
       color = "Cluster") +
  theme_minimal() +
  theme(legend.position = "right")
```




```r
#Create dataframe to inspect cluster with words
# Extract columns 2:12 from the climateact_word dataset
Climateact_word_selected <- climateact_word[, 2:12]

# Add the cluster assignments from both PCA and UMAP to the extracted dataframe
Climateact_word_selected$pca_Cluster <- db_result$cluster
Climateact_word_selected$umap_cluster <- db_result_umap$cluster

# Rename the resulting dataframe
Climateact_word_clustered <- Climateact_word_selected
```