007_analysis_VoxPress.R

AliceZhang

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```
##########################################################################
################    TEXT ANALYSIS VOX PRESS RELEASE   ###################
##########################################################################
# BY: ALICE TIANBO ZHANG (alice.tianbo.zhang@gmail.com)
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#### LOAD PACKAGE ####
#packages <- c("tm", "plyr", "ggplot2", "wordCloud", "RColorBrewer", "SnowballC","tm.plugin.webmining",
#install.packages(packages)
library(tm)
```

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

```
library(plyr)
library(ggplot2)
```

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

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

```
library(wordcloud)
```

```
## Loading required package: RColorBrewer
```

```
library(RColorBrewer)
library(SnowballC)
library(tm.plugin.webmining)
```

```
##
## Attaching package: 'tm.plugin.webmining'
```

```
## The following object is masked from 'package:base':
##
##     parse
```

```
library(stm)
```

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

```
#### SET DIRECTORY ####
rm(list = ls())
setwd("~/Dropbox/Research_Columbia/Renewables Voting (Urpelainen Zhang)/JOP/UZ_JOP2021_Replication")
```

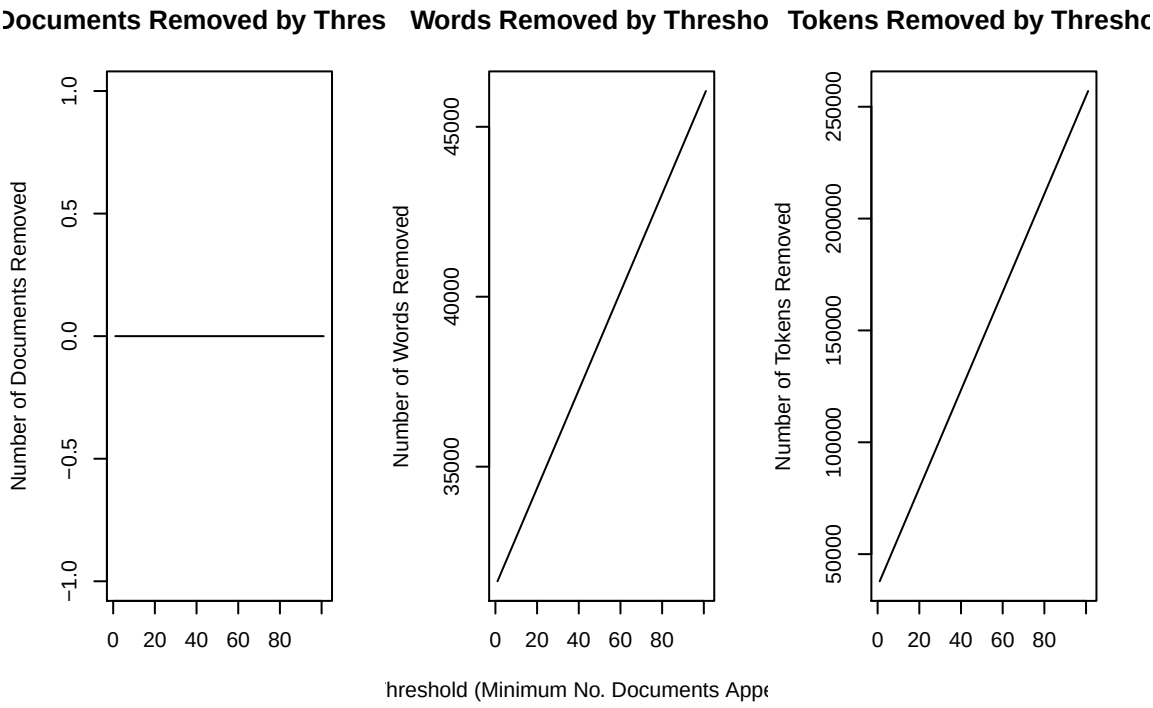
```
#### LOAD DATA ####
full_data <- read.csv("Data/Final/vox_district_year_cleaned.csv", header = T, sep = ",", strip.white = T
full_data <- full_data[complete.cases(full_data$text),]

#### PRE-PROCESS DATA ####
# Remote HTML
full_data$text <- gsub("<.*?>", "", full_data$text)
full_data$text <- gsub(" ", "", full_data$text)

# Removes stopwords, numbers, punctuation, html, and then convert to lower case and stem words
processed <- textProcessor(documents = full_data$text, metadata = full_data, striphtml = TRUE)
```

```
## Building corpus...
## Converting to Lower Case...
## Removing punctuation...
## Removing stopwords...
## Removing numbers...
## Stemming...
## Creating Output...
```

```
# Plot the number of words and documents removed for different thresholds
plotRemoved(processed$documents, lower.thresh = seq(1, 200, by = 100))
```




```
# Remove infrequent words (words that do not appear in at least 10 documents were removed)
out <- prepDocuments(processed$documents, processed$vocab, processed$meta, lower.thresh = 10)
```

```
## Removing 42829 of 47074 terms (71616 of 495947 tokens) due to frequency
## Your corpus now has 2056 documents, 4245 terms and 424331 tokens.
```

```
# Create file structure for STM package
docs <- out$documents # word indices and associated counts
vocab <- out$vocab # words associated with the word indices
meta <- out$meta # matrix with document covariates
```

```r
meta$party <- as.factor(meta$party)


#### STRUCTURAL TOPIC MODEL - ESTIMATION ####
# Metadata (covariates) affects either:
#  1) topic prevalence: how much each topic contributes to a document; or
#  2) topic content:

## Model initiation w/t spectral (Model: Party * Cumulative Capacity/Count + Flexible trend in year)
# Option "spectral" ensures that the same results are generated each time
# Converged in iteration 60
stm_prev2 <- stm(docs, vocab, K = 30, prevalence = ~ party * cum_capacity_turbine + s(year),
                 max.em.its = 200, data = meta, init.type = "Spectral", control=list(recoverEG=FALSE), s
```

```
## Beginning Spectral Initialization
##   Calculating the gram matrix...
##   Finding anchor words...
##      .............................
##   Recovering initialization...
##      ....................................
## Initialization complete.
## ..................................................................................................
## Completed E-Step (3 seconds).
## Completed M-Step.
## Completing Iteration 1 (approx. per word bound = -6.942)
## ..................................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 2 (approx. per word bound = -6.797, relative change = 2.090e-02)
## ..................................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 3 (approx. per word bound = -6.749, relative change = 7.060e-03)
## ..................................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 4 (approx. per word bound = -6.728, relative change = 3.189e-03)
## ..................................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 5 (approx. per word bound = -6.716, relative change = 1.806e-03)
## Topic 1: project, wind, will, turbin, develop
##  Topic 2: energi, american, oil, gas, increas
##  Topic 3: congressman, murphi, will, health, energi
##  Topic 4: energi, oil, gas, price, bill
##  Topic 5: state, presid, letter, governor, feder
##  Topic 6: iraq, peopl, war, one, year
##  Topic 7: tax, credit, extend, bill, busi
##  Topic 8: fund, request, program, communiti, million
##  Topic 9: power, energi, hydropow, renew, electr
##  Topic 10: will, use, new, project, system
##  Topic 11: energi, land, resourc, natur, feder
##  Topic 12: trade, china, manufactur, earth, rare
##  Topic 13: job, american, energi, creat, will
```

```
##  Topic 14: hurrican, emerg, storm, flood, insur
##  Topic 15: disast, assist, counti, feder, damag
##  Topic 16: oil, coast, drill, can, gulf
##  Topic 17: energi, renew, will, fuel, solar
##  Topic 18: air, epa, clean, pollut, environment
##  Topic 19: will, nation, america, presid, countri
##  Topic 20: job, green, energi, congressman, will
##  Topic 21: budget, will, spend, year, peopl
##  Topic 22: will, inform, can, report, japan
##  Topic 23: water, california, fund, forest, fire
##  Topic 24: new, storm, jersey, feder, disast
##  Topic 25: billion, million, fund, state, program
##  Topic 26: energi, home, colorado, effici, heat
##  Topic 27: energi, clean, solar, renew, nation
##  Topic 28: will, busi, district, work, communiti
##  Topic 29: energi, will, bill, new, clean
##  Topic 30: research, program, fund, institut, health
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 6 (approx. per word bound = -6.708, relative change = 1.118e-03)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 7 (approx. per word bound = -6.703, relative change = 7.584e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 8 (approx. per word bound = -6.699, relative change = 5.307e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 9 (approx. per word bound = -6.697, relative change = 3.948e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 10 (approx. per word bound = -6.695, relative change = 3.032e-04)
## Topic 1: wind, project, turbin, will, farm
##  Topic 2: energi, oil, gas, american, price
##  Topic 3: congressman, murphi, will, health, energi
##  Topic 4: energi, oil, gas, price, renew
##  Topic 5: state, presid, letter, governor, feder
##  Topic 6: iraq, war, peopl, one, american
##  Topic 7: tax, credit, extend, busi, bill
##  Topic 8: fund, program, request, school, educ
##  Topic 9: power, energi, hydropow, will, electr
##  Topic 10: project, will, use, new, provid
##  Topic 11: energi, land, resourc, natur, feder
##  Topic 12: trade, china, manufactur, earth, rare
##  Topic 13: job, american, creat, energi, will
##  Topic 14: hurrican, flood, emerg, storm, insur
##  Topic 15: disast, counti, assist, damag, feder
##  Topic 16: oil, coast, drill, gulf, can
##  Topic 17: energi, renew, fuel, will, electr
```

```
##  Topic 18: air, epa, environment, clean, pollut
##  Topic 19: will, nation, must, america, presid
##  Topic 20: green, job, congressman, energi, will
##  Topic 21: budget, spend, will, year, get
##  Topic 22: will, inform, report, japan, march
##  Topic 23: water, california, fund, million, forest
##  Topic 24: new, york, jersey, feder, disast
##  Topic 25: billion, million, state, fund, provid
##  Topic 26: energi, home, colorado, effici, heat
##  Topic 27: energi, clean, solar, technolog, renew
##  Topic 28: district, will, work, visit, communiti
##  Topic 29: energi, will, bill, new, clean
##  Topic 30: research, program, institut, fund, health
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 11 (approx. per word bound = -6.693, relative change = 2.437e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 12 (approx. per word bound = -6.692, relative change = 2.063e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 13 (approx. per word bound = -6.691, relative change = 1.753e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 14 (approx. per word bound = -6.690, relative change = 1.607e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 15 (approx. per word bound = -6.689, relative change = 1.379e-04)
## Topic 1: wind, project, will, turbin, said
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: congressman, murphi, will, health, energi
##  Topic 4: oil, energi, gas, price, compani
##  Topic 5: state, letter, presid, feder, governor
##  Topic 6: iraq, war, peopl, american, one
##  Topic 7: tax, credit, extend, busi, year
##  Topic 8: fund, program, school, request, educ
##  Topic 9: power, energi, hydropow, will, washington
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, natur, feder
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, energi
##  Topic 14: hurrican, storm, flood, emerg, insur
##  Topic 15: disast, counti, assist, damag, feder
##  Topic 16: oil, drill, coast, gulf, spill
##  Topic 17: energi, renew, fuel, will, electr
##  Topic 18: air, epa, environment, pollut, clean
##  Topic 19: will, nation, must, need, america
##  Topic 20: green, congressman, energi, job, will
##  Topic 21: budget, spend, will, get, year
```

```
##  Topic 22: will, inform, report, march, japan
##  Topic 23: water, fund, california, million, forest
##  Topic 24: new, york, jersey, feder, hurrican
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, colorado, effici, heat
##  Topic 27: energi, clean, solar, technolog, republican
##  Topic 28: district, week, will, visit, work
##  Topic 29: energi, will, bill, new, clean
##  Topic 30: research, program, institut, number, health
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 16 (approx. per word bound = -6.688, relative change = 1.225e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 17 (approx. per word bound = -6.687, relative change = 1.284e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 18 (approx. per word bound = -6.686, relative change = 1.275e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 19 (approx. per word bound = -6.685, relative change = 1.285e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 20 (approx. per word bound = -6.684, relative change = 1.161e-04)
## Topic 1: wind, project, will, said, turbin
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: congressman, murphi, will, energi, health
##  Topic 4: oil, energi, gas, price, compani
##  Topic 5: state, letter, feder, presid, request
##  Topic 6: iraq, war, peopl, american, militari
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, hydropow, washington
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, natur
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, energi
##  Topic 14: hurrican, storm, emerg, flood, insur
##  Topic 15: disast, counti, assist, damag, feder
##  Topic 16: oil, drill, coast, gulf, spill
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, environment, clean, pollut
##  Topic 19: nation, will, must, need, america
##  Topic 20: green, congressman, energi, job, busi
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, report, japan, inform
##  Topic 23: water, fund, california, million, forest
##  Topic 24: new, york, hurrican, jersey, feder
##  Topic 25: billion, million, provid, state, fund
```

```
##  Topic 26: energi, home, effici, colorado, heat
##  Topic 27: energi, clean, solar, technolog, republican
##  Topic 28: district, week, visit, hous, will
##  Topic 29: energi, will, bill, new, clean
##  Topic 30: research, program, institut, number, grant
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 21 (approx. per word bound = -6.684, relative change = 1.106e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 22 (approx. per word bound = -6.683, relative change = 1.024e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 23 (approx. per word bound = -6.682, relative change = 1.097e-04)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 24 (approx. per word bound = -6.682, relative change = 1.190e-04)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 25 (approx. per word bound = -6.681, relative change = 9.746e-05)
## Topic 1: wind, project, will, said, turbin
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, gas, price, compani
##  Topic 5: state, feder, letter, declar, request
##  Topic 6: iraq, war, peopl, american, militari
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, hydropow, water
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, bill
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, storm, emerg, flood, can
##  Topic 15: disast, counti, assist, damag, feder
##  Topic 16: oil, drill, coast, gulf, spill
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, environment, pollut, nuclear
##  Topic 19: nation, will, must, need, can
##  Topic 20: green, congressman, energi, job, busi
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, assist
##  Topic 23: water, fund, california, million, forest
##  Topic 24: new, york, hurrican, jersey, feder
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, effici, heat, colorado
##  Topic 27: energi, clean, solar, republican, technolog
##  Topic 28: district, week, hous, visit, will
##  Topic 29: energi, will, bill, new, clean
```

```
##  Topic 30: research, program, institut, number, grant
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 26 (approx. per word bound = -6.680, relative change = 8.023e-05)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 27 (approx. per word bound = -6.680, relative change = 7.765e-05)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 28 (approx. per word bound = -6.679, relative change = 6.537e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 29 (approx. per word bound = -6.679, relative change = 6.109e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 30 (approx. per word bound = -6.679, relative change = 5.328e-05)
## Topic 1: wind, project, will, said, turbin
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, gas, price, compani
##  Topic 5: state, feder, declar, request, letter
##  Topic 6: iraq, war, peopl, american, militari
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, hydropow, water
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, storm, emerg, flood, can
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, coast, gulf, offshor
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, environment, nuclear, pollut
##  Topic 19: nation, will, need, must, can
##  Topic 20: congressman, green, energi, job, busi
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, assist
##  Topic 23: water, fund, million, california, feder
##  Topic 24: new, hurrican, york, jersey, feder
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, effici, heat, illinoi
##  Topic 27: energi, clean, solar, republican, technolog
##  Topic 28: district, week, hous, visit, work
##  Topic 29: energi, will, bill, new, clean
##  Topic 30: research, program, institut, number, grant
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
```

```
## Completing Iteration 31 (approx. per word bound = -6.678, relative change = 5.099e-05)
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 32 (approx. per word bound = -6.678, relative change = 4.605e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 33 (approx. per word bound = -6.678, relative change = 4.744e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 34 (approx. per word bound = -6.677, relative change = 4.201e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 35 (approx. per word bound = -6.677, relative change = 3.842e-05)
## Topic 1: wind, project, said, will, turbin
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, gas, price, compani
##  Topic 5: state, feder, declar, request, governor
##  Topic 6: iraq, war, peopl, american, militari
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, hydropow, water
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, storm, emerg, flood, can
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, coast, gulf, offshor
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, environment, nuclear, pollut
##  Topic 19: nation, will, need, must, can
##  Topic 20: congressman, green, energi, job, busi
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: water, fund, million, california, feder
##  Topic 24: new, hurrican, york, jersey, feder
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, heat
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, work
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (2 seconds).
## Completed M-Step.
## Completing Iteration 36 (approx. per word bound = -6.677, relative change = 3.496e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
```

```
## Completing Iteration 37 (approx. per word bound = -6.677, relative change = 3.025e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 38 (approx. per word bound = -6.676, relative change = 3.580e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 39 (approx. per word bound = -6.676, relative change = 3.209e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 40 (approx. per word bound = -6.676, relative change = 3.068e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, gas, compani
##  Topic 5: state, feder, declar, request, governor
##  Topic 6: iraq, war, peopl, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, hydropow, feder
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, storm, emerg, flood, can
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, coast, gulf, offshor
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, environment, nuclear, pollut
##  Topic 19: nation, will, need, must, can
##  Topic 20: congressman, green, energi, busi, job
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, water, million, california, feder
##  Topic 24: new, hurrican, york, jersey, feder
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, heat
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, work
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 41 (approx. per word bound = -6.676, relative change = 2.593e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 42 (approx. per word bound = -6.676, relative change = 3.061e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
```

```
## Completing Iteration 43 (approx. per word bound = -6.675, relative change = 2.646e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 44 (approx. per word bound = -6.675, relative change = 3.178e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 45 (approx. per word bound = -6.675, relative change = 2.823e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, gas, compani
##  Topic 5: state, feder, declar, request, governor
##  Topic 6: iraq, war, peopl, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, hydropow, feder
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, weather
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, coast, gulf, offshor
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, environment, nuclear, pollut
##  Topic 19: nation, need, will, must, can
##  Topic 20: congressman, green, energi, busi, job
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, water, million, california, feder
##  Topic 24: new, hurrican, york, jersey, feder
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, work
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 46 (approx. per word bound = -6.675, relative change = 2.489e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 47 (approx. per word bound = -6.675, relative change = 2.346e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 48 (approx. per word bound = -6.675, relative change = 2.294e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
```

```
## Completing Iteration 49 (approx. per word bound = -6.674, relative change = 2.161e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 50 (approx. per word bound = -6.674, relative change = 2.157e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, gas, compani
##  Topic 5: state, feder, declar, request, governor
##  Topic 6: iraq, peopl, war, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, hydropow, feder
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, weather
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, coast, gulf, offshor
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, environment, nuclear, pollut
##  Topic 19: nation, need, must, will, can
##  Topic 20: congressman, green, energi, busi, sestak
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, water, million, california, program
##  Topic 24: new, hurrican, york, jersey, feder
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, work
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, applic
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 51 (approx. per word bound = -6.674, relative change = 1.746e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 52 (approx. per word bound = -6.674, relative change = 2.273e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 53 (approx. per word bound = -6.674, relative change = 2.014e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 54 (approx. per word bound = -6.674, relative change = 1.607e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
```

```
## Completing Iteration 55 (approx. per word bound = -6.674, relative change = 2.334e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, gas, compani
##  Topic 5: state, feder, declar, request, storm
##  Topic 6: iraq, peopl, war, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, request
##  Topic 9: power, energi, will, feder, hydropow
##  Topic 10: project, will, use, new, provid
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, weather
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, coast, offshor, gulf
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, nuclear, environment, pollut
##  Topic 19: nation, need, must, will, can
##  Topic 20: congressman, green, energi, busi, sestak
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, water, million, california, program
##  Topic 24: new, hurrican, york, jersey, feder
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, offic
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, applic
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 56 (approx. per word bound = -6.673, relative change = 2.009e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 57 (approx. per word bound = -6.673, relative change = 2.061e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 58 (approx. per word bound = -6.673, relative change = 2.194e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 59 (approx. per word bound = -6.673, relative change = 1.844e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 60 (approx. per word bound = -6.673, relative change = 1.568e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
```

```
##  Topic 4: oil, energi, price, gas, compani
##  Topic 5: state, feder, declar, request, storm
##  Topic 6: iraq, peopl, war, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, program, school, educ, communiti
##  Topic 9: power, energi, will, feder, hydropow
##  Topic 10: project, will, use, new, fund
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, prepar
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, coast, offshor, gulf
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, nuclear, environment, pollut
##  Topic 19: nation, need, must, will, can
##  Topic 20: congressman, green, energi, busi, sestak
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, million, water, california, program
##  Topic 24: new, hurrican, york, jersey, fema
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, offic
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 61 (approx. per word bound = -6.673, relative change = 1.493e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 62 (approx. per word bound = -6.673, relative change = 1.453e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 63 (approx. per word bound = -6.673, relative change = 1.491e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 64 (approx. per word bound = -6.673, relative change = 1.497e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 65 (approx. per word bound = -6.672, relative change = 1.462e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, gas, compani
##  Topic 5: state, feder, declar, request, storm
##  Topic 6: iraq, peopl, war, american, one
##  Topic 7: tax, credit, extend, year, busi
```

```
##  Topic 8: fund, program, school, educ, communiti
##  Topic 9: power, energi, will, feder, water
##  Topic 10: project, will, use, new, fund
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, prepar
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, offshor, coast, gulf
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, nuclear, environment, pollut
##  Topic 19: nation, need, must, will, can
##  Topic 20: congressman, green, energi, busi, sestak
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, million, water, california, program
##  Topic 24: new, hurrican, york, jersey, fema
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, health
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 66 (approx. per word bound = -6.672, relative change = 1.447e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 67 (approx. per word bound = -6.672, relative change = 1.339e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 68 (approx. per word bound = -6.672, relative change = 1.308e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 69 (approx. per word bound = -6.672, relative change = 1.277e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 70 (approx. per word bound = -6.672, relative change = 1.290e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, compani, gas
##  Topic 5: state, feder, declar, request, storm
##  Topic 6: iraq, peopl, war, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, school, program, educ, communiti
##  Topic 9: power, energi, will, feder, water
##  Topic 10: project, will, use, fund, new
##  Topic 11: land, energi, resourc, feder, develop
```

```
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, prepar
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, offshor, coast, gulf
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, nuclear, environment, pollut
##  Topic 19: nation, need, must, will, can
##  Topic 20: congressman, green, energi, busi, sestak
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, million, water, california, program
##  Topic 24: new, hurrican, york, jersey, fema
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, health
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 71 (approx. per word bound = -6.672, relative change = 1.312e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 72 (approx. per word bound = -6.672, relative change = 1.290e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 73 (approx. per word bound = -6.672, relative change = 1.211e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 74 (approx. per word bound = -6.672, relative change = 1.133e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 75 (approx. per word bound = -6.672, relative change = 1.099e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, compani, gas
##  Topic 5: state, feder, declar, request, storm
##  Topic 6: iraq, peopl, war, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, school, program, educ, communiti
##  Topic 9: power, energi, will, feder, water
##  Topic 10: project, will, use, fund, new
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, prepar
##  Topic 15: disast, counti, assist, damag, busi
```

```
##  Topic 16: oil, drill, offshor, coast, gulf
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, nuclear, environment, pollut
##  Topic 19: nation, need, must, will, can
##  Topic 20: congressman, green, energi, busi, sestak
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, million, water, california, program
##  Topic 24: new, hurrican, york, jersey, fema
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, health
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 76 (approx. per word bound = -6.672, relative change = 1.128e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 77 (approx. per word bound = -6.671, relative change = 1.176e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 78 (approx. per word bound = -6.671, relative change = 1.221e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 79 (approx. per word bound = -6.671, relative change = 1.220e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 80 (approx. per word bound = -6.671, relative change = 1.269e-05)
## Topic 1: wind, project, said, will, power
##  Topic 2: energi, oil, gas, price, american
##  Topic 3: murphi, congressman, will, energi, american
##  Topic 4: oil, energi, price, compani, gas
##  Topic 5: state, feder, declar, request, storm
##  Topic 6: iraq, peopl, war, american, one
##  Topic 7: tax, credit, extend, year, busi
##  Topic 8: fund, school, program, educ, communiti
##  Topic 9: power, energi, will, feder, water
##  Topic 10: project, will, use, fund, new
##  Topic 11: land, energi, resourc, feder, develop
##  Topic 12: trade, china, manufactur, earth, export
##  Topic 13: job, american, creat, will, tax
##  Topic 14: hurrican, emerg, storm, can, prepar
##  Topic 15: disast, counti, assist, damag, busi
##  Topic 16: oil, drill, offshor, coast, gulf
##  Topic 17: energi, renew, fuel, bill, will
##  Topic 18: air, epa, nuclear, environment, pollut
##  Topic 19: nation, need, must, will, can
```

```
##  Topic 20: congressman, green, energi, busi, sestak
##  Topic 21: budget, spend, get, year, will
##  Topic 22: will, march, japan, report, team
##  Topic 23: fund, million, water, california, program
##  Topic 24: new, hurrican, york, jersey, fema
##  Topic 25: billion, million, provid, state, fund
##  Topic 26: energi, home, illinoi, effici, green
##  Topic 27: energi, clean, solar, republican, markey
##  Topic 28: district, week, hous, visit, health
##  Topic 29: energi, will, bill, clean, new
##  Topic 30: research, program, institut, grant, number
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 81 (approx. per word bound = -6.671, relative change = 1.265e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Completing Iteration 82 (approx. per word bound = -6.671, relative change = 1.188e-05)
## ..........................................................................................
## Completed E-Step (1 seconds).
## Completed M-Step.
## Model Converged
```

```
# ## Model search w/t algorithm from Lee and Mimno (2014)
# Note: This is not a preferred model because the algorithm is not deterministic and produces wildly di
# For details: Roberts, Margaret E., Brandon M. Stewart, and Dustin Tingley. 2019. "Stm: An R Package f

# stm_prev3 <- stm(docs, vocab, K = 0, prevalence = ~ party * cum_capacity_turbine + s(year),
#                  max.em.its = 200, data = meta, init.type = "Spectral", control=list(recoverEG=FALSE)
#

#### STRUCTURAL TOPIC MODEL - INTERPRETATION ####

##  Check the words associated with each topic
# Words associated with each topic
pdf("Results/Figures/STM/stmPrev2_wordLabels_fixedSeed.pdf")
plot.STM(stm_prev2, type = "labels", n = 10, topics = c(1:10), width = 150, xlim = c(-100,150), text.ce
dev.off()
```

```
## pdf
##   2
```

```
# Proportion of documents that belong to each topic
pdf("Results/Figures/STM/stmPrev2_topicProportion_fixedSeed.pdf")
plot.STM(stm_prev2, type = "summary", n = 5, xlim = c(0, 0.3))
dev.off()
```

```
## pdf
##   2
```

```
# Check the topic words associated with each topic
labelTopics(stm_prev2)
```

```
## Topic 1 Top Words:
##       Highest Prob: wind, project, said, will, power, turbin, develop
```

```
##       FREX: turbin, minnesota, wind, walz, ptc, farm, colorado
##       Lift: sky, huelskamp, walz, blumenau, blade, minnesota, win-win
##       Score: sky, ptc, turbin, walz, project, colorado, huelskamp
## Topic 2 Top Words:
##       Highest Prob: energi, oil, gas, price, american, increas, product
##       FREX: barrel, price, gasolin, refineri, explor, domest, gas
##       Lift: environmentally-saf, expo, ok-, fallin, kline, anwr, shale
##       Score: energi, oil, expo, gas, drill, kline, price
## Topic 3 Top Words:
##       Highest Prob: murphi, congressman, will, energi, american, tim, billion
##       FREX: murphi, tim, steel, healthcar, medicar, academi, nomin
##       Lift: e-new, workshop, hereon, pittsburgh, elain, murphi, lebanon
##       Score: murphi, workshop, medicar, hereon, tim, steel, lebanon
## Topic 4 Top Words:
##       Highest Prob: oil, energi, compani, price, gas, renew, fuel
##       FREX: oil, price, big, leas, petroleum, reserv, profit
##       Lift: tonsth, spr, exxonmobil, goug, specul, multin, d-utica
##       Score: oil, energi, drill, leas, renew, gas, royalti
## Topic 5 Top Words:
##       Highest Prob: state, feder, declar, request, storm, counti, governor
##       FREX: declar, governor, maryland, letter, deleg, storm, request
##       Lift: alexand, elijah, presidentw, torrenti, snowfal, declar, harold
##       Score: storm, declar, disast, maryland, request, fema, governor
## Topic 6 Top Words:
##       Highest Prob: iraq, peopl, war, american, one, say, get
##       FREX: iraq, war, iraqi, troop, soldier, men, peac
##       Lift: ferri, saddam, iraqi, patriot, vietnam, iraq, pakistan
##       Score: iraq, ferri, soldier, iraqi, war, pentagon, troop
## Topic 7 Top Words:
##       Highest Prob: tax, credit, extend, year, busi, propos, bill
##       FREX: credit, deduct, tax, extend, qualifi, bond, incom
##       Lift: marriag, excis, depreci, deduct, pariti, transact, amt
##       Score: credit, tax, deduct, depreci, amt, bond, qualifi
## Topic 8 Top Words:
##       Highest Prob: fund, school, program, educ, communiti, request, student
##       FREX: student, school, colleg, scienc, biggert, educ, teacher
##       Lift: parkinson, biggert, detroit, omnibus, math, junior, programsâ
##       Score: parkinson, student, colleg, biggert, request, educ, school
## Topic 9 Top Words:
##       Highest Prob: power, energi, will, feder, water, hydropow, washington
##       FREX: walden, northwest, hydropow, dam, oregon, hydro, hast
##       Lift: bpa, bonnevill, mcmorri, walden, rodger, mcdermott, hydro
##       Score: bonnevill, walden, hydropow, mcmorri, oregon, hast, bpa
## Topic 10 Top Words:
##       Highest Prob: project, will, use, fund, new, provid, develop
##       FREX: name, valuabl, street, entiti, hampshir, blood, project
##       Lift: trail, descript, lane, blood, pedestrian, interchang, corridor
##       Score: trail, project, blood, request, hampshir, descript, youth
## Topic 11 Top Words:
##       Highest Prob: land, energi, resourc, feder, develop, natur, state
##       FREX: land, arizona, idaho, pipelin, miner, interior, permit
##       Lift: gosar, blm, lamborn, idaho, copper, tipton, keyston
##       Score: blm, arizona, gosar, copper, land, lamborn, tipton
## Topic 12 Top Words:
```

```
##       Highest Prob: trade, china, manufactur, earth, export, rare, american
##       FREX: rare, china, trade, chines, export, unfair, currenc
##       Lift: rare, chinaâ, tariff, wto, chines, unfair, china
##       Score: rare, china, trade, wto, currenc, chines, chinaâ
## Topic 13 Top Words:
##       Highest Prob: job, american, creat, will, tax, energi, busi
##       FREX: job, creat, economi, creation, american, strengthen, america
##       Lift: re-train, high-skil, retrain, ail, outsourc, lawâ, job
##       Score: job, tax, energi, invest, american, manufactur, economi
## Topic 14 Top Words:
##       Highest Prob: hurrican, emerg, storm, can, prepar, weather, will
##       FREX: hurrican, prepar, outag, weather, sandi, radio, shelter
##       Lift: cum, flashlight, battery-pow, cuomo, monoxid, pet, noaa
##       Score: hurrican, storm, cum, tornado, evacu, outag, sandi
## Topic 15 Top Words:
##       Highest Prob: disast, counti, assist, damag, busi, insur, loan
##       FREX: insur, farmer, loan, disast, crop, tornado, agricultur
##       Lift: contigu, fsa, memphi, shelbi, straight-lin, renter, low-interest
##       Score: fsa, disast, tornado, flood, memphi, sba, insur
## Topic 16 Top Words:
##       Highest Prob: oil, drill, offshor, coast, gulf, spill, new
##       FREX: spill, offshor, gulf, drill, coast, ocean, mexico
##       Lift: mouth, deepwat, spill, rig, fishermen, nantucket, lng
##       Score: drill, offshor, gulf, spill, oil, coast, mouth
## Topic 17 Top Words:
##       Highest Prob: energi, renew, fuel, bill, will, effici, technolog
##       FREX: fuel, renew, hydrogen, incent, cell, sourc, geotherm
##       Lift: digest, non-park, fuel-cel, boutiqu, hydrogen, udal, charger
##       Score: energi, renew, fuel, incent, effici, hydrogen, bill
## Topic 18 Top Words:
##       Highest Prob: air, epa, nuclear, environment, pollut, clean, protect
##       FREX: epa, pollut, air, wast, mercuri, toxic, cleanup
##       Lift: mercuri, mtbe, asthma, epa, dust, toxic, yucca
##       Score: mercuri, epa, pollut, nuclear, mtbe, cleanup, emiss
## Topic 19 Top Words:
##       Highest Prob: nation, need, must, will, can, america, presid
##       FREX: challeng, world, must, believ, vision, america, polit
##       Lift: german, madam, cheap, partisanship, dingel, vision, glass
##       Score: german, world, dingel, polit, america, must, countri
## Topic 20 Top Words:
##       Highest Prob: congressman, green, energi, busi, sestak, job, train
##       FREX: sestak, joe, green, pennsylvania, navi, workforc, director
##       Lift: gamesa, highest-rank, sestak, anti-terror, historian, -star, phd
##       Score: sestak, gamesa, murphi, green, delawar, highest-rank, aircraft
## Topic 21 Top Words:
##       Highest Prob: budget, spend, get, year, will, peopl, republican
##       FREX: think, spend, debt, budget, deficit, dont, thing
##       Lift: wealthiest, bail, penc, health-car, gentleman, your, hes
##       Score: republican, budget, debt, deficit, medicar, gentleman, spend
## Topic 22 Top Words:
##       Highest Prob: will, march, japan, report, team, assist, citizen
##       FREX: japan, japanes, reactor, march, flight, airport, team
##       Lift: exit, japan, japanes, radiat, faa, humanitarian, flight
##       Score: japan, exit, japanes, reactor, flight, airport, radiat
```

```
## Topic 23 Top Words:
##       Highest Prob: fund, million, water, california, program, feder, year
##       FREX: california, san, fire, diego, water, appropri, port
##       Lift: ana, diego, schwarzenegg, santa, californian, san, wildfir
##       Score: california, ana, diego, san, wildfir, water, fire
## Topic 24 Top Words:
##       Highest Prob: new, hurrican, york, jersey, fema, said, feder
##       FREX: jersey, katrina, beach, serrano, island, hurrican, york
##       Lift: rip, orlean, jersey, katrina, serrano, rita, alabama
##       Score: hurrican, fema, iren, jersey, katrina, rip, disast
## Topic 25 Top Words:
##       Highest Prob: billion, million, provid, state, fund, health, includ
##       FREX: unemploy, modern, billion, medicaid, mortgag, care, coverag
##       Lift: amtrak, cobra, cutback, foreclosur, zandi, formula, one-tim
##       Score: amtrak, billion, cobra, medicaid, unemploy, invest, mortgag
## Topic 26 Top Words:
##       Highest Prob: energi, home, illinoi, effici, green, heat, save
##       FREX: illinoi, weller, perlmutt, rebat, bartlett, heat, upgrad
##       Lift: r-morri, rebat, weller, coloradan, perlmutt, upfront, illinoi
##       Score: rebat, weller, illinoi, perlmutt, energi, bartlett, nrel
## Topic 27 Top Words:
##       Highest Prob: energi, clean, solar, republican, markey, billion, industri
##       FREX: markey, nevada, garamendi, republican, subsidi, guarante, fossil
##       Lift: cliff, dina, titus, solyndra, berkley, garamendi, markey
##       Score: markey, garamendi, energi, republican, nevada, cliff, subsidi
## Topic 28 Top Words:
##       Highest Prob: district, week, hous, visit, health, offic, work
##       FREX: kansa, hall, visit, tour, click, kirkpatrick, week
##       Lift: kirkpatrick, medford, kansan, attende, kansa, topeka, repli
##       Score: kirkpatrick, kansa, tour, veteran, visit, oregon, medford
## Topic 29 Top Words:
##       Highest Prob: energi, will, bill, clean, new, global, reduc
##       FREX: climat, warm, global, emiss, carbon, greenhous, standard
##       Lift: energy-intens, postag, outpac, american-grown, waxman-markey, copenhagen, ace
##       Score: energi, emiss, carbon, climat, ace, warm, global
## Topic 30 Top Words:
##       Highest Prob: research, program, institut, grant, number, applic, fund
##       FREX: institut, applic, nasa, research, space, tribal, number
##       Lift: nasa, aeronaut, nonprofit, modif, polar, disord, andor
##       Score: nasa, research, aeronaut, tribal, elig, applic, grant
```

```r
# Word Cloud
for (i in 1:30){
  pdf(paste0("Results/Figures/STM/stmPrev2_cloud_topic", i, "_fixedSeed.pdf"))
  cloud(stm_prev2, topic = i)
  dev.off()
}

# ## Check documents associated with each topic
# M2thoughts1 <- findThoughts(stm_prev2, texts = meta$text, n = 1, topics = 1)$docs[[1]]
# M2thoughts2 <- findThoughts(stm_prev2, texts = meta$text, n = 1, topics = 9)$docs[[1]]
#
# par(mfrow = c(1, 2),mar = c(.5, .5, 1, .5))
# plotQuote(M2thoughts1, width = 30, main = "Topic 1")
```

```r
# plotQuote(M2thoughts2, width = 30, main = "Topic 9", text.cex = 0.5)

## Check metadata and topic relationship
prep2 <- estimateEffect(1:30 ~ party * cum_capacity_turbine + s(year), stm_prev2,
                        meta = meta, uncertainty = "None")

# plot.estimateEffect(prep2, covariate = "party", topics = c(1:30),
#                     model = stm_prev2, method = "difference",
#                     cov.value1 = "D", cov.value2 = "R",
#                     xlab = "Republican    <---->    Democrat",
#                     main = "Effect of Partisanship: Democrat vs. Republican",
#                     xlim = c(-0.23, 0.23), labeltype = "prob", n = 1, verbose.labels = F)

# Effect of partisanship on topic : Compare D to R
topicNames <- c("Wind Projects", "Oil & Gas Price", "Congressman Murphy", "Energy Independence", "Disas
                "Iraq War", "Tax Credit", "Public Program Funding", "Water Resources", "New Projects",
                "Land Resources", "Trade (China)", "Jobs", "Hurricane", "Disaster",
                "Oil Drilling", "Renewable Energy", "Environmental Protection", "Policy (US)", "Congres
                "Budget", "Nuclear (Japan)", "Funding (California)", "Hurricane (NY/NJ)", "Public Progr
                "Energy Efficiency", "Clean Energy", "Events", "Climate Change", "R&D")

pdf("Results/Figures/STM/stmPrev2_effectParty_fixedSeed.pdf", width = 12, height = 10)
plot.estimateEffect(prep2, covariate = "party", topics = c(1:30),
                    model = stm_prev2, method = "difference",
                    cov.value1 = "D", cov.value2 = "R",
                    xlab = "Republican    <------->    Democrat",
                    main = "Effect of Partisanship: Democrat vs. Republican",
                    xlim = c(-0.23, 0.23), cex = 0.52, labeltype = "custom",
                    custom.labels = topicNames)
dev.off()
```

```
## pdf
##   2
```

```r
## Covariate interactions
# Fit a model of only one topic and loop through all topics
for (i in 1:30){
  prep2 <- estimateEffect(c(i) ~ party * cum_capacity_turbine + s(year), stm_prev2,
                          meta = meta, uncertainty = "None")

  pdf(paste0("Results/Figures/STM/stmPrev2_effectCumCapaParty_topic", i, "_fixedSeed.pdf"))
  plot.estimateEffect(prep2, covariate = "cum_capacity_turbine",
                      model = stm_prev2, method = "continuous", xlab = "Cumulative Capacity (mw)",
                      moderator = "party", moderator.value = "D", linecol = "blue", printlegend = F,
                      ylim = c(0, 0.4), main = paste0("Topic - ", topicNames[[i]]))

  plot.estimateEffect(prep2, covariate = "cum_capacity_turbine",
                      model = stm_prev2, method = "continuous", xlab = "Cumulative Capacity (mw)",
                      moderator = "party", moderator.value = "R", linecol = "red", add = T, printlegend
  legend("topleft", c("Democrat", "Republican"), lwd = 2, col = c("blue", "red"))
  dev.off()
}
```