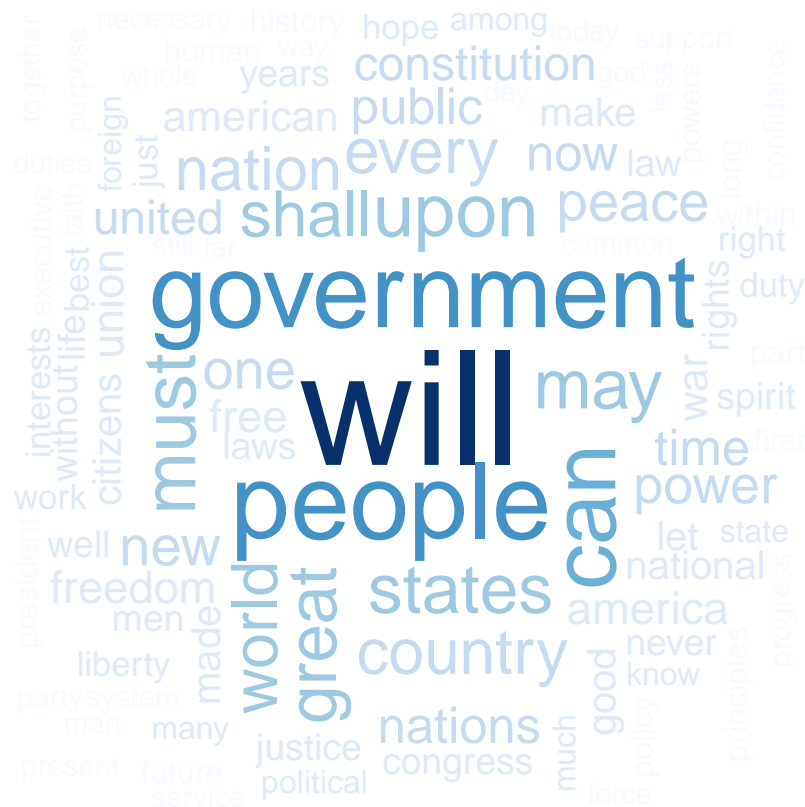


What did the presidents say at their inauguration?

Here I explore the texts of U.S. presidents' inaugural speeches, from that of George Washington to that of Donald Trump which was delivered on 20th Jan. I use tools from text mining and natural language processing like sentiment analysis and topic modeling to analyze interesting trends and patterns.

First, I will create the wordclouds for both overall speech and individual speeches

word cloud for overall speech



I noticed most of the speeches mentioned ‘will’, ‘government’ and ‘people’. I guess they all expected to strengthen the relationship between government and people. What about focus for different parties?

Now, I will spilt all speeches into two groups: Republican party and Democratic party.

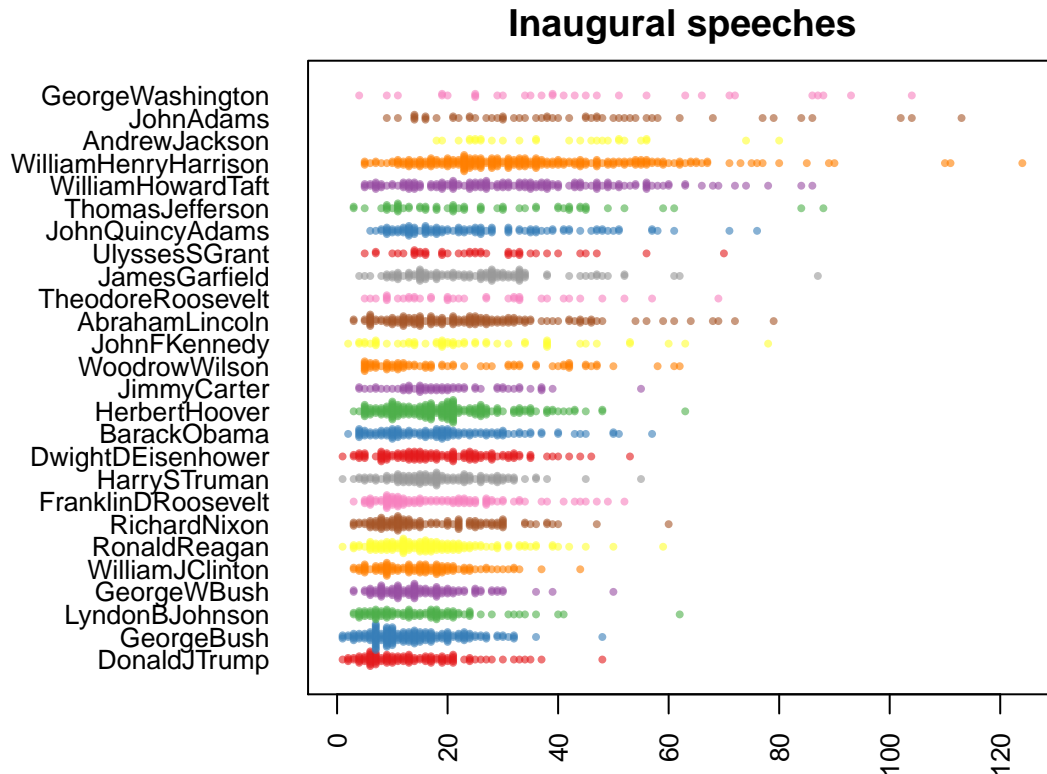
A word cloud of the Preamble to the U.S. Constitution. The words are arranged in a circular pattern, with 'We the People' being the most prominent text in the center. Other words include 'United States', 'do hereby', 'establish', 'this', 'Constitution', 'to secure', 'the Blessings of Liberty', 'for our', 'ourselves and our', 'Posterity', 'We the People', 'do hereby', 'establish', 'this', 'Constitution', 'to secure', 'the Blessings of Liberty', 'for our', 'ourselves and our', 'Posterity'.

By creating the interactive visualize important words in individual speeches before, Let's choose the most typical example for two parties between Obama and Trump to compare. I noticed from the word cloud of Trump that among the most frequent words in this inaugural speeches are 'America', 'obama', 'dreams'. This suggests that the thoughts of Trump is probably associated with Obama which helps American to achieve their dreams in the future. However, Obama emphasized the jobs, relatively different from Trump.

Next, I use sentences as units of analysis for this project since sentences are natural language units for organizing thoughts and ideas. For each extracted sentence, I apply sentiment analysis by using NRC sentiment lexicon. I use a sequential id for every sentence called ‘sent.id’ and calculated the number of words in each sentence called ‘sentence length’.

2

Word numbers of sentences for each selectd speech



Compared with prior prior U.S. presidents such as George Washington, I noticed that several presidents especially for Donald Trump preferred very short sentences in their speech. As time goes on, most of the presidents prefer short sentences, which probably seem more free-style speeches. I guess Trump expected to talk very little but do a lot in the future.

So, What are these short sentences in Trump and Obama speeches? Let's compare the differences since they are the typical examples for two parties.

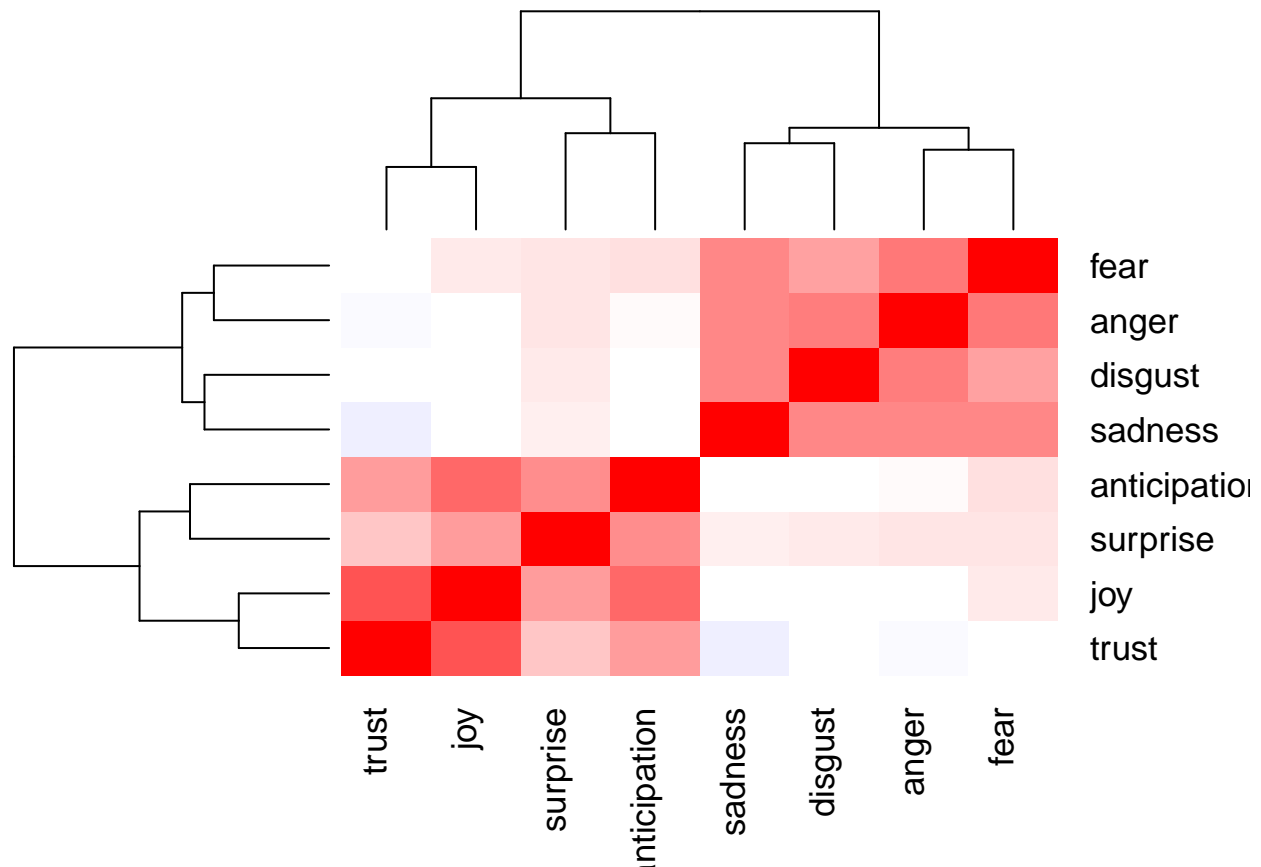
```
##          sentences
## 1      Thank you.
## 2              C.
## 3      Thank you.
## 4      God bless you.
## 5      Thank you.
## 6 God bless America.
```

```
##          sentences
## 1      Thank you.
## 2      Thank you.
## 3 diversity and openness;
## 4      Thank you.
```

I noticed Lots of unformal sentences used in both their speeches such as 'Thank you' and 'God bless America', which probably proved they weren't good at delivering a formal speech.

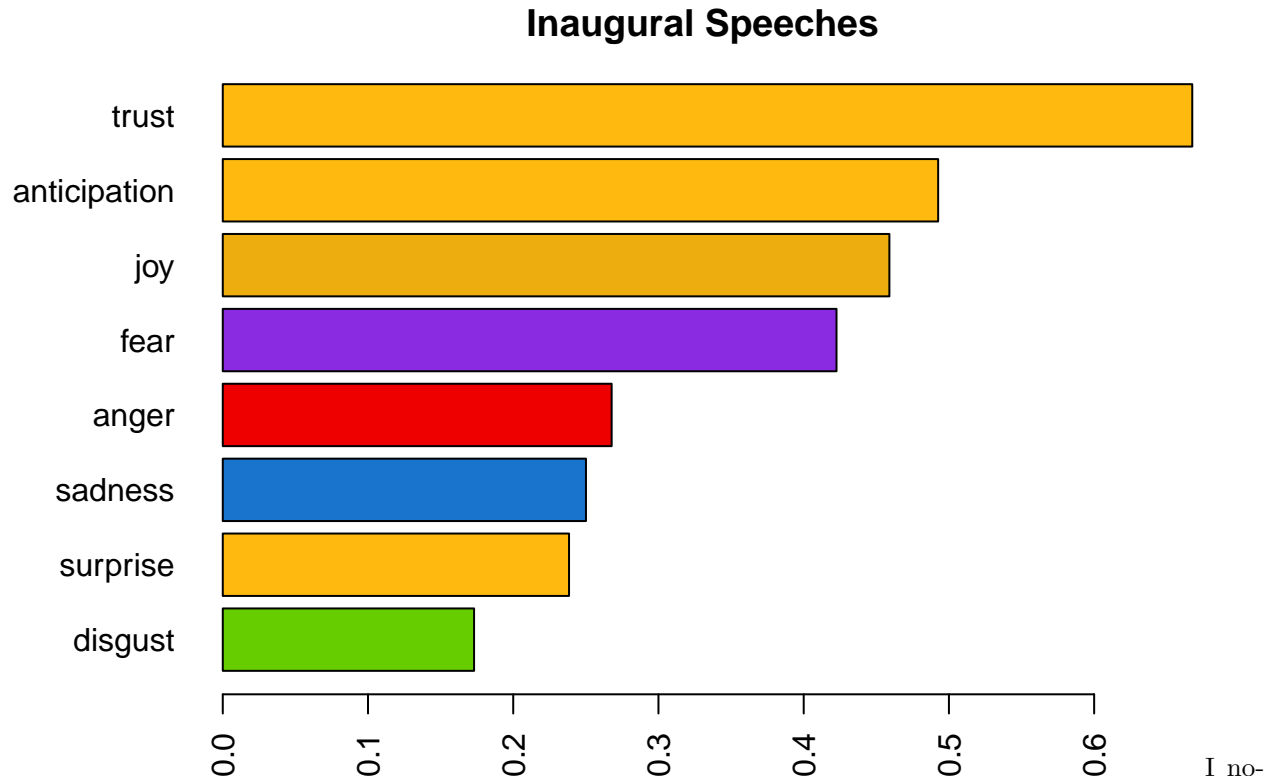
What about the emotions in all speeches? How the presidents shift sentiments in their speeches? Now, I will cluster the emtions in all speeches.

Clustering of emotions for all speeches



Looking through all speeches, I can cluster emotions into two main groups. Group1 (negative): anger, fear, sadness, disgust Group2 (positive): trust, surprise, joy, anticipation These two groups represents very different emotions.

Bar plot for mean value of clustering emotions for sentence list



I noticed that most of positive emotions such as trust and anticipation are widely used in speech of presidents. In contrast, they avoided negative emotions such as disgust and sadness. Although presidents still felt fear and surprise when they delivered speeches, they all expected to contribute their positive emotions to audience so that all people in America would have confidence to support them.

Let's look at Trump and Obama in detail. What are the emotionally charged sentences in their speeches? # Sentences with emotions for Trump and Obama

```
## [1] "There should be no fear."
## [2] "And God bless America."
## [3] "America will start winning again, winning like never before."
## [4] "And God bless America."
## [5] "And God bless America."
## [6] "America will start winning again, winning like never before."
## [7] "They have been magnificent."
## [8] "And God bless America."

## [1] "Barack Obama"

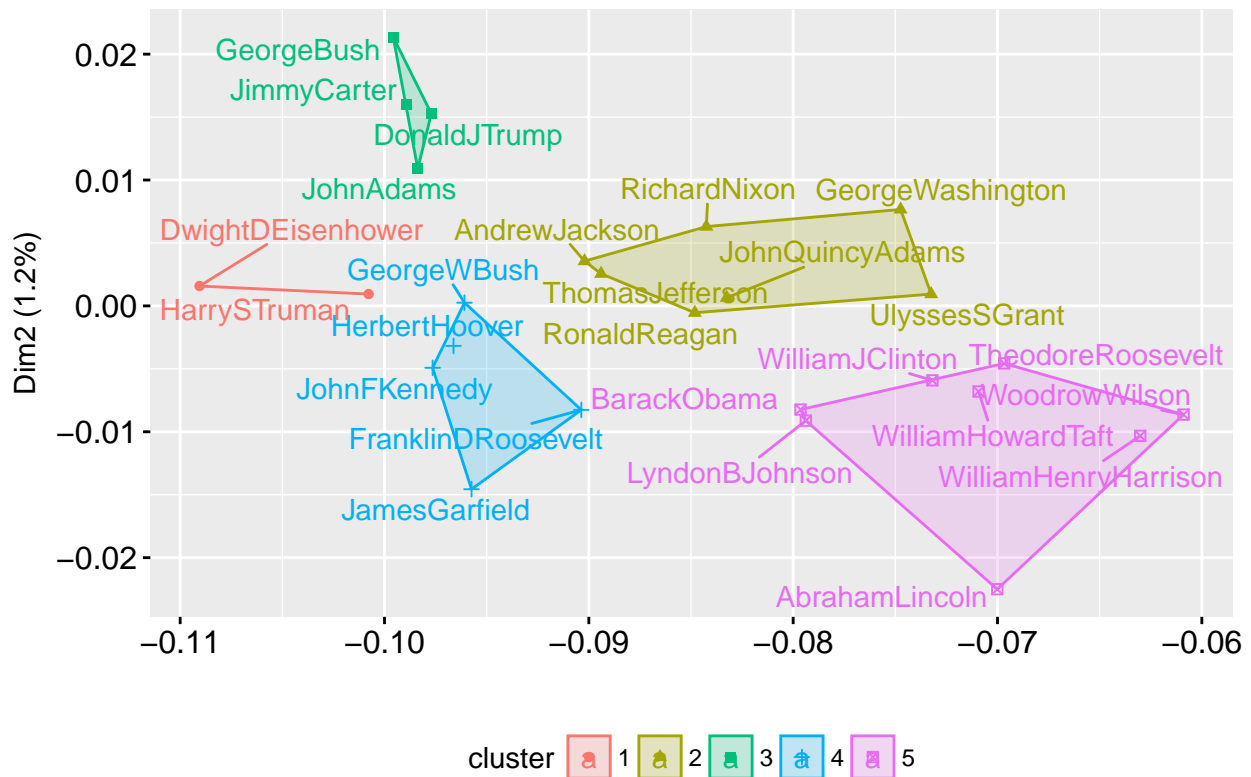
## [1] "The Capital was abandoned."
## [2] "This is the journey we continue today."
## [3] "Our capacity remains undiminished."
## [4] "Our capacity remains undiminished."
## [5] "when the wages of honest labor liberate families from the brink of hardship."
## [6] "The Capital was abandoned."
## [7] "when the wages of honest labor liberate families from the brink of hardship."
## [8] "We affirm the promise of our democracy."
```

For Donald Trump, I noticed that all these sentences with emotions expects to deliver the same topic: America will become more powerful in the future. However, for Barack Obama, he mentioned twice 'Our capacity

remains undiminished', which probably shows his fear for capital and jobs.

What about the clustering emotions relationship among all speeches? In this project, I expect to cluster them into five groups. That means presidents in the same group used similar emotions in their speeches.

Cluster plot



I see that DonoldJTrump, GeorgeBush, JimmyCarter and JohnAdams are analyzed in the same cluster. Although they used different length of sentences in their speeches, I was surprised that they delivered similar emotions. Thus, there are no necessary relationships between the length of sentences and the emotion of speeches.

Finally, I expect to dig more stories on the topic of speeches. # Data analysis – Topic modeling

Create 5 topics for all speeches

```
##
##      1      2      3      4      5
## 1206 1128 1473  815  925

##      [,1]      [,2]      [,3]      [,4]      [,5]      [,6]
## [1,] "nation"  "can"      "must"    "make"    "human"    "seek"
## [2,] "govern"  "power"    "constitut" "parti"   "general"  "object"
## [3,] "american" "let"      "work"     "live"    "today"    "man"
## [4,] "duti"     "offic"    "high"     "patriot" "trust"    "measur"
## [5,] "forc"     "necessari" "maintain" "practic" "revenu"   "product"
##
##      [,7]
## [1,] "common"
## [2,] "feder"
## [3,] "day"
## [4,] "charact"
```

```
## [5,] "establish"

##      Topic 1   Topic 2   Topic 3   Topic 4   Topic 5
## [1,] "will"    "govern"   "world"   "everi"    "great"
## [2,] "nation"  "state"    "new"     "shall"    "war"
## [3,] "can"     "power"    "american" "will"     "public"
## [4,] "must"    "constitut" "america"  "countri"  "made"
## [5,] "peopl"   "right"    "time"    "peopl"    "may"
## [6,] "peac"    "law"      "freedom"  "duti"     "secur"
## [7,] "make"    "union"    "let"      "may"      "forc"
## [8,] "free"    "citizen"  "hope"     "spirit"   "polici"
## [9,] "justic"  "upon"     "year"     "interest" "countri"
## [10,] "life"   "one"      "work"     "just"     "without"
## [11,] "human"  "unit"     "live"     "upon"     "protect"
## [12,] "good"   "execut"   "one"      "offic"    "foreign"
## [13,] "respons" "parti"    "today"    "princip"  "purpos"
## [14,] "believ" "respect"  "man"      "confid"   "requir"
## [15,] "never"  "equal"    "now"      "great"    "necessari"
## [16,] "long"   "polit"    "day"      "best"     "maintain"
## [17,] "seek"   "question" "come"     "honor"    "industri"
## [18,] "common" "exist"    "histori"  "preserv"  "condit"
## [19,] "way"    "whole"    "know"     "much"     "increas"
## [20,] "world"  "general"  "men"      "servic"   "practic"
```

After I dig out 5 topics for all speeches, I expect to find wheather there are significant differences of topics between two parties.

```
## A LDA_Gibbs topic model with 5 topics.
```

```
## A LDA_Gibbs topic model with 5 topics.
```

```
##
```

```
## 1 2 3 4 5
```

```
## 1 1 2 1 1
```

```
##
```

```
## 1 2 3 4 5
```

```
## 1 1 2 1 1
```

```
##      [,1]      [,2]      [,3]      [,4]      [,5]      [,6]
## [1,] "make"    "legisl"  "fellowcitizen" "prosper" "histori" "servic"
## [2,] "interest" "respect" "republ"      "caus"    "practic" "far"
## [3,] "one"     "public"  "congress"    "civil"   "form"    "respons"
## [4,] "american" "within"  "control"     "live"    "becom"   "man"
## [5,] "earth"   "revolut" "say"         "price"   "virtu"   "bank"
##      [,7]
## [1,] "measur"
## [2,] "howev"
## [3,] "continu"
## [4,] "intern"
## [5,] "commiss"
```

```
##      Topic 1   Topic 2   Topic 3   Topic 4   Topic 5
## [1,] "constitut" "interest" "will"    "state"    "earth"
## [2,] "war"       "can"      "govern"  "upon"     "possess"
## [3,] "make"      "law"      "nation"  "shall"    "revolut"
## [4,] "spirit"    "peac"     "peopl"   "american" "whose"
## [5,] "offic"     "everi"    "countri" "duti"     "famili"
```

```

## [6,] "faith"      "principl" "power"    "import"   "say"
## [7,] "legisl"     "liberti"  "may"      "without"  "strict"
## [8,] "can"        "respect"  "public"   "well"     "forc"
## [9,] "preserv"    "union"    "must"     "foreign"  "function"
## [10,] "execut"    "good"     "right"    "best"     "privileg"
## [11,] "support"   "honor"    "unit"     "busi"     "rest"
## [12,] "fellowcitizen" "duti"     "great"    "within"   "price"
## [13,] "work"      "part"     "one"      "polici"   "progress"
## [14,] "author"    "place"    "world"    "control"  "virtu"
## [15,] "prosper"   "just"     "now"      "confid"   "activ"
## [16,] "histori"   "republ"   "time"     "exercis"  "difficulti"
## [17,] "call"      "bless"    "citizen"  "feder"    "failur"
## [18,] "servic"    "limit"    "congress" "live"     "found"
## [19,] "ever"      "caus"     "freedom"  "administr" "hous"
## [20,] "proper"    "danger"   "protect"  "becom"    "presid"

##      [,1]      [,2]      [,3]      [,4]      [,5]      [,6]
## [1,] "make"     "legisl"  "fellowcitizen" "prosper" "histori" "servic"
## [2,] "interest"  "respect" "republ"        "caus"    "practic" "far"
## [3,] "one"       "public"  "congress"      "civil"   "form"    "respons"
## [4,] "american"  "within"  "control"       "live"    "becom"   "man"
## [5,] "earth"     "revolut" "say"           "price"   "virtu"   "bank"
##      [,7]
## [1,] "measur"
## [2,] "howev"
## [3,] "continu"
## [4,] "intern"
## [5,] "commiss"

##      Topic 1      Topic 2      Topic 3      Topic 4      Topic 5
## [1,] "constitut"  "interest" "will"      "state"     "earth"
## [2,] "war"        "can"      "govern"    "upon"      "possess"
## [3,] "make"       "law"      "nation"    "shall"     "revolut"
## [4,] "spirit"     "peac"     "peopl"     "american"  "whose"
## [5,] "offic"      "everi"    "countri"   "duti"      "famili"
## [6,] "faith"      "principl" "power"     "import"    "say"
## [7,] "legisl"     "liberti"  "may"       "without"   "strict"
## [8,] "can"        "respect"  "public"    "well"     "forc"
## [9,] "preserv"    "union"    "must"     "foreign"   "function"
## [10,] "execut"    "good"     "right"     "best"     "privileg"
## [11,] "support"   "honor"    "unit"      "busi"     "rest"
## [12,] "fellowcitizen" "duti"     "great"     "within"   "price"
## [13,] "work"      "part"     "one"       "polici"   "progress"
## [14,] "author"    "place"    "world"     "control"  "virtu"
## [15,] "prosper"   "just"     "now"       "confid"   "activ"
## [16,] "histori"   "republ"   "time"      "exercis"  "difficulti"
## [17,] "call"      "bless"    "citizen"   "feder"    "failur"
## [18,] "servic"    "limit"    "congress"  "live"     "found"
## [19,] "ever"      "caus"     "freedom"   "administr" "hous"
## [20,] "proper"    "danger"   "protect"   "becom"    "presid"

```

I am very surprised that the topics for two parties are the same. However, compared with the topics of all speeches, the topics for party are different. That means the topics of all speeches are more generalized like looking at the whole country while the thoes of parties are more specific like detailed plan for future.

In summary, presidents all used relatively different topics and emotions. However, they all expect to try their

best to strengthen the power of America in the world. Although, what happens in the future is uncertain, I suppose Americans should support Trump now so that they can achieve their dreams.