

“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 the focus of individual speech?

Interactive visualize important words in individual speeches

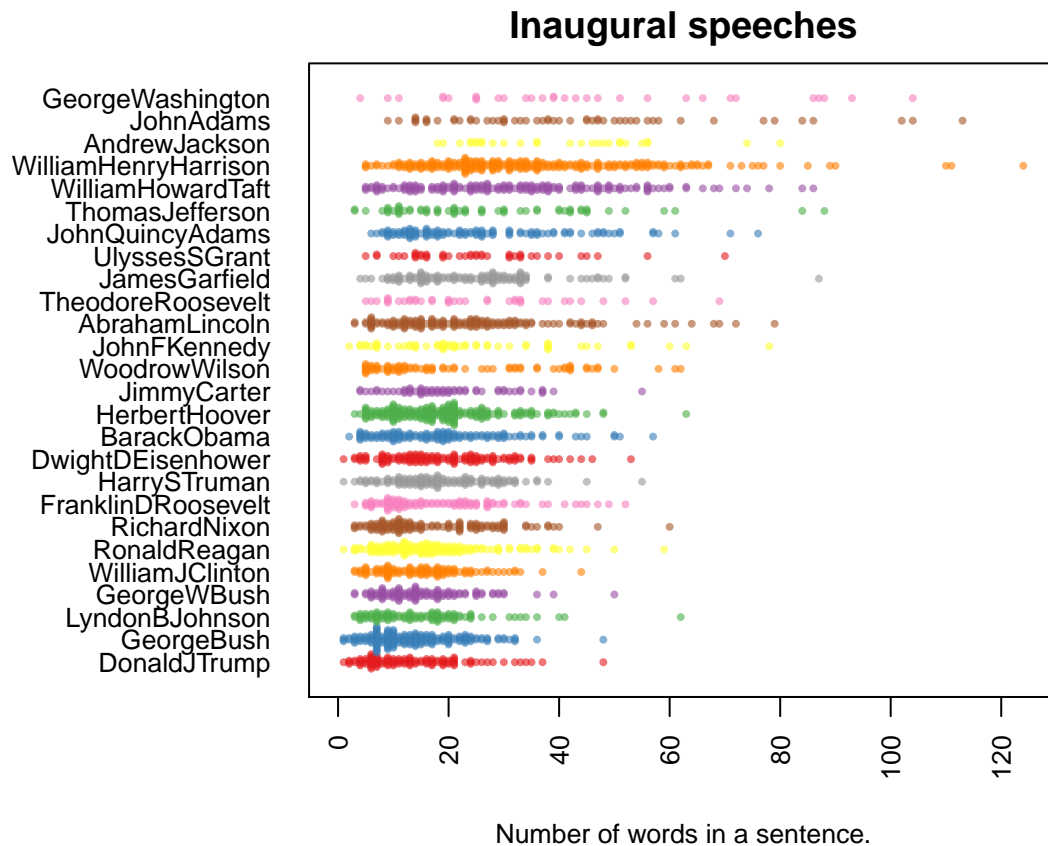
Shiny applications not supported in static R Markdown documents

Let's choose the most recent two speeches 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 dream 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’.

After generating each sentences for all speeches, I expect to focus on analyzing the length of sentences. I chose a subset of better known presidents or presidential candidates to analysis for simple visualization.

Word number 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 president prefer short sentences, which probably seems 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.

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

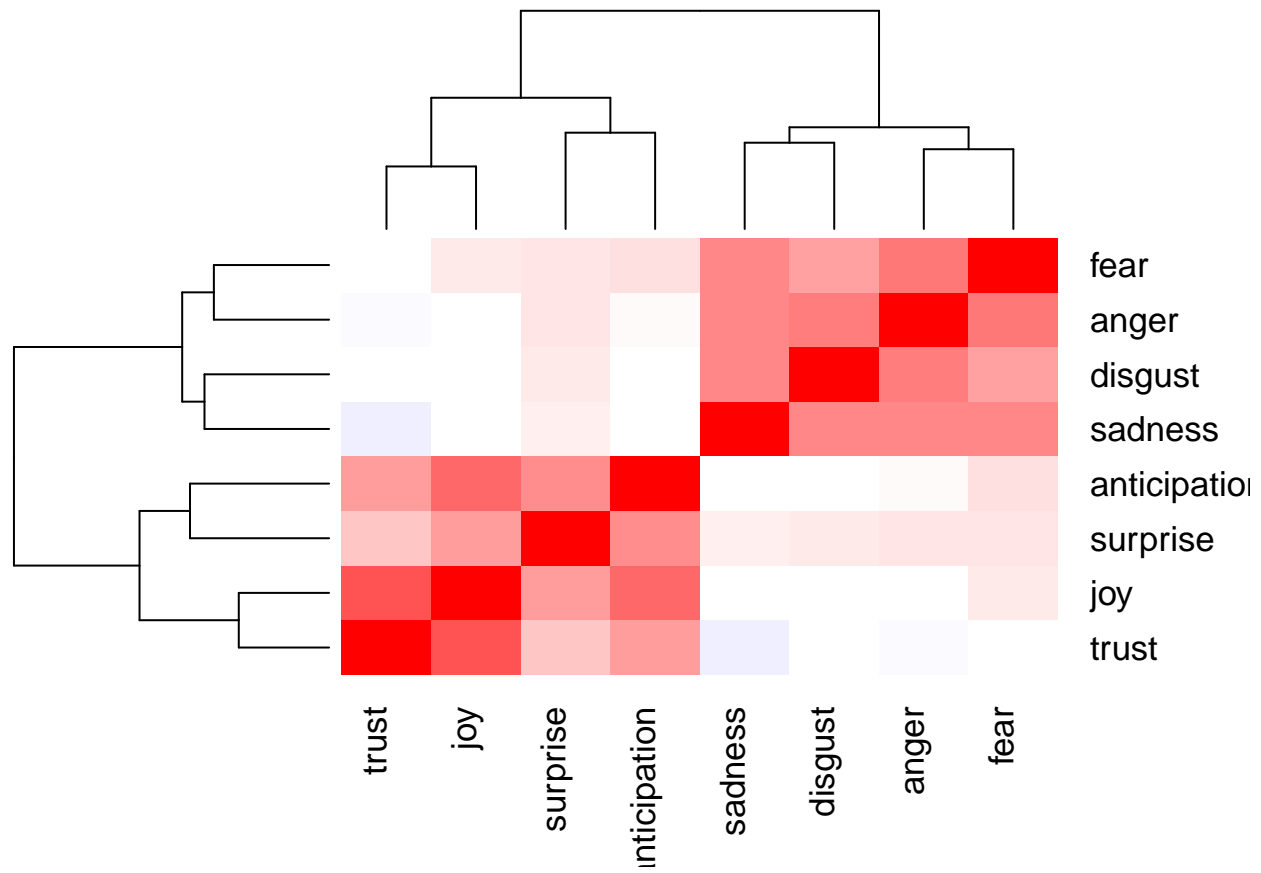
##          sentences
## 1      Thank you.
## 2      Thank you.
## 3 diversity and openness;
## 4      Thank you.
```

I noticed Lots of unformal sentences used in his speech such as 'Thank you' and 'God bless America', which

probably proved they weren't good at delivering a formal speech.

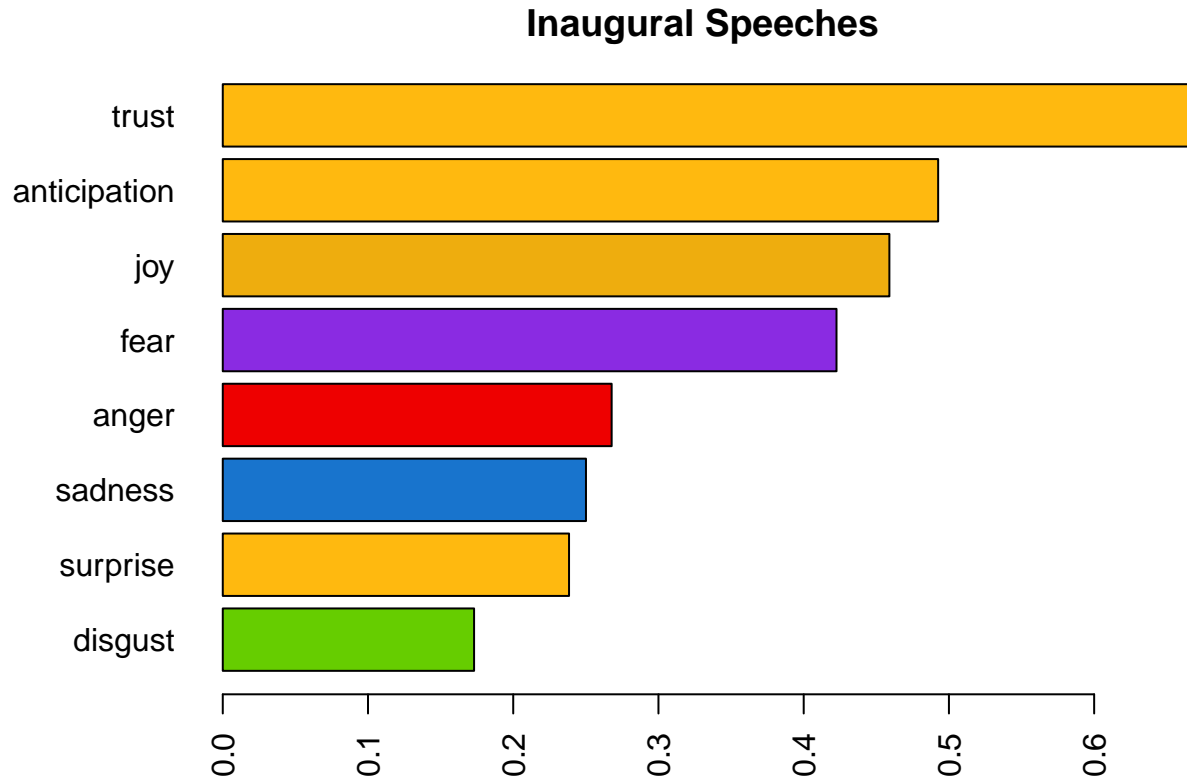
What about the emotions in all speeches? How the presidents shift sentiments in their speeches? Now, I will cluster the emotions in all speeches

Clustering of emotions



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 avoid 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 American would have confidence to support them.

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

```
## [1] "Donald Trump"

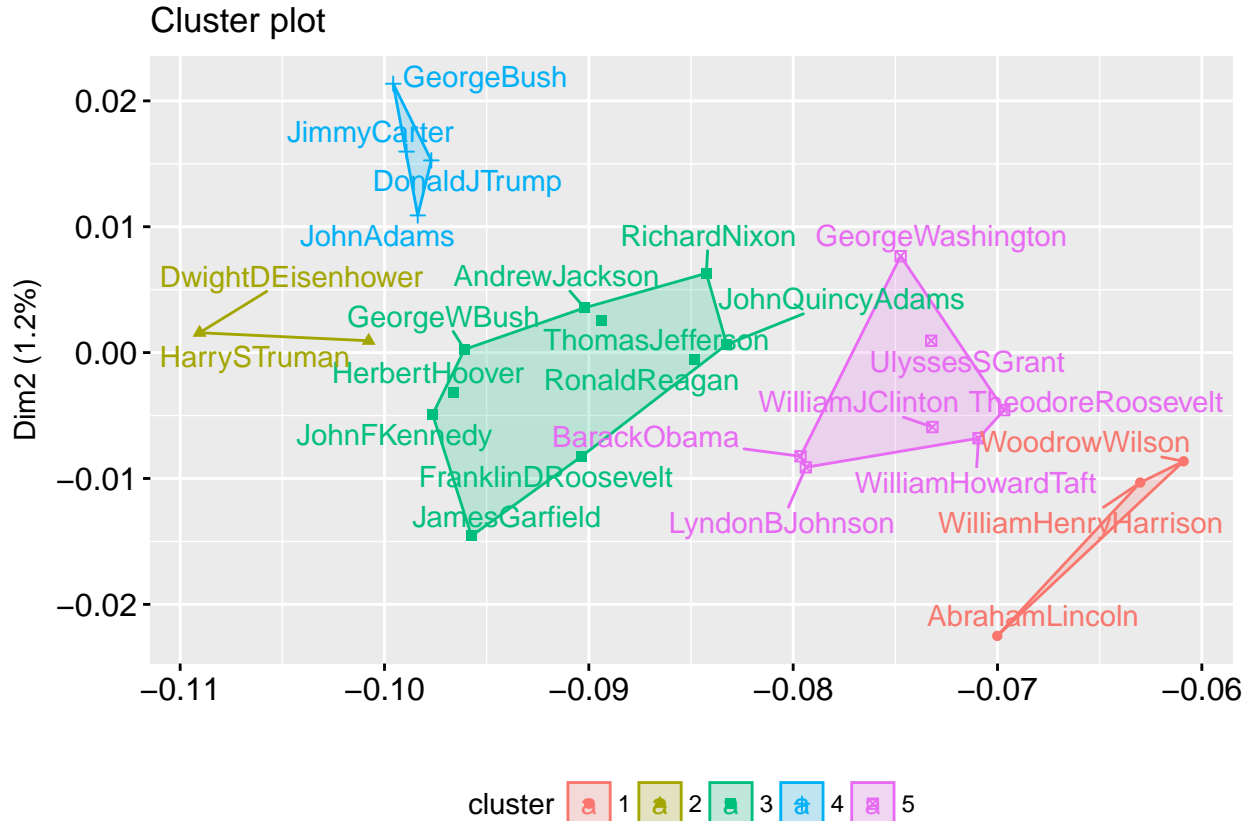
## [1] "There should be no fear."
## [2] "And God bless America."
## [3] "America will start winning again, winning like never before."
## [4] "And God bless America."
## [5] "And God bless America."
## [6] "America will start winning again, winning like never before."
## [7] "They have been magnificent."
## [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 president in the same group used similar emotions in their speech.



I see that Donald Trump, George Bush, Jimmy Carter and John Adams 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

```
##
## 1 2 3 4 5 6 7 8 9 10
## 536 655 495 455 421 518 742 641 452 637

##      [,1]      [,2]      [,3]      [,4]      [,5]
## [1,] "happy"   "result"   "difficulti" "sourc"   "attain"
## [2,] "necessari" "industri" "revenu"    "busi"    "commerc"
## [3,] "offic"    "confid"   "discharg"  "abil"    "offici"
## [4,] "anoth"    "singl"    "destroy"   "prejudic" "insist"
## [5,] "intern"   "treati"   "prepar"    "contribut" "sincer"
## [6,] "law"      "legisl"   "enforc"    "amend"    "due"
## [7,] "work"     "courag"   "build"     "back"     "conscienc"
## [8,] "dream"    "came"     "celebr"    "thank"    "triumph"
## [9,] "union"    "object"   "feder"     "grant"    "none"
## [10,] "democraci" "mankind" "small"     "weak"     "digniti"
##      [,6]      [,7]
```

```
## [1,] "disturb"    "various"
## [2,] "economi"   "trade"
## [3,] "heretofor" "profound"
## [4,] "prefer"    "southern"
## [5,] "cultiv"    "aggress"
## [6,] "remedi"    "immedi"
## [7,] "young"     "bold"
## [8,] "vice"      "gather"
## [9,] "reserv"    "perpetu"
## [10,] "choic"    "join"
```

```
##      Topic 1  Topic 2  Topic 3  Topic 4  Topic 5  Topic 6
## [1,] "countri" "public" "will"  "can"   "nation" "law"
## [2,] "great"   "secur"  "shall" "one"   "peac"   "upon"
## [3,] "spirit"  "necessari" "duti"  "citizen" "war"    "parti"
## [4,] "mani"    "industri" "peopl" "peopl"  "great"  "congress"
## [5,] "much"    "revenu"   "may"   "everi"  "justic" "execut"
## [6,] "prosper" "product"  "offic" "good"   "polici" "question"
## [7,] "everi"   "busi"     "confid" "must"   "foreign" "constitut"
## [8,] "present" "use"      "faith"  "equal"  "interest" "made"
## [9,] "institut" "commerc"  "support" "polit"  "never"   "subject"
## [10,] "danger"  "increas"  "servic" "civil"  "countri" "legisl"
## [11,] "happi"   "without"  "upon"   "right"  "relat"   "effect"
## [12,] "liberti" "demand"   "purpos" "well"   "just"    "opinion"
## [13,] "exist"   "forc"     "countri" "individu" "secur"   "elect"
## [14,] "experi"  "requir"   "public"  "common" "maintain" "principl"
## [15,] "caus"    "econom"   "best"    "without" "honor"   "action"
## [16,] "less"    "interest" "take"    "anoth"  "mean"    "control"
## [17,] "patriot" "encourag" "give"    "communiti" "effort"  "administr"
## [18,] "success" "great"    "respons" "person"  "ever"    "given"
## [19,] "peopl"   "provid"   "trust"   "free"    "among"   "enforc"
## [20,] "influenc" "economi"  "high"    "just"    "intern"  "depart"

##      Topic 7  Topic 8  Topic 9  Topic 10
## [1,] "will"    "time"   "govern" "world"
## [2,] "new"     "year"   "state"  "freedom"
## [3,] "must"    "now"    "power"  "men"
## [4,] "american" "day"    "constitut" "life"
## [5,] "america" "come"   "union"   "free"
## [6,] "make"    "first"  "right"   "human"
## [7,] "work"    "histori" "unit"    "know"
## [8,] "need"    "today"  "preserv" "peopl"
## [9,] "land"    "chang"  "general" "believ"
## [10,] "way"    "god"    "author"  "can"
## [11,] "let"    "futur"  "protect" "live"
## [12,] "togeth" "hope"   "limit"   "long"
## [13,] "old"    "still"  "whole"   "strength"
## [14,] "better" "let"    "object"  "hope"
## [15,] "find"   "centuri" "feder"   "see"
## [16,] "thing"  "stand"  "within"  "man"
## [17,] "home"   "hand"   "territori" "democraci"
## [18,] "promis" "presid" "part"    "earth"
## [19,] "opportun" "heart"  "exercis" "help"
## [20,] "children" "call"   "direct"  "seek"
```