Sentiment Analysis

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Comparing Trump's State of the Union Address with Nixon's.

```
library(knitr)
```

```
## Warning: package 'knitr' was built under R version 3.4.3
```

```
library(tidytext)
```

```
## Warning: package 'tidytext' was built under R version 3.4.4
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.4.3
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(stringr)
```

```
## Warning: package 'stringr' was built under R version 3.4.3
```

```
library(readtext)
```

```
## Warning: package 'readtext' was built under R version 3.4.3
```

```
library(wordcloud)
```

```
## Warning: package 'wordcloud' was built under R version 3.4.4
```

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

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.4.4
```

```
library(reshape2)
```

```
## Warning: package 'reshape2' was built under R version 3.4.4
```

```
get_sentiments("bing")
```

```
## Warning: package 'bindrcpp' was built under R version 3.4.3
```

```
## # A tibble: 6,788 x 2
##    word        sentiment
##    <chr>       <chr>
##  1 2-faced     negative
```

```
##  2 2-faces     negative
##  3 a+          positive
##  4 abnormal    negative
##  5 abolish     negative
##  6 abominable  negative
##  7 abominably  negative
##  8 abominate   negative
##  9 abomination negative
## 10 abort       negative
## # ... with 6,778 more rows
```

```
nrc_joy <- get_sentiments("nrc") %>%
  filter(sentiment == "joy")

nrc_anger <- get_sentiments("nrc") %>%
  filter(sentiment == "anger")

nrc_anticipation <- get_sentiments("nrc") %>%
  filter(sentiment == "anticipation")
```

Now we look into Trump's State of the Union Address.

```
trump <- readtext("trump first state of the union.txt")
trump <- trump %>% unnest_tokens(word,text)

trump_anger <- trump %>%
  inner_join(nrc_anger) %>%
  count(word, sort = TRUE)
```

```
## Joining, by = "word"
```

Here, we see some words that are clearly associated with anger, such as aggression and disgrace, but we also see some words that might have been taken out of context and may not actually be used in an angry context like deserve and powerful.

```
trump_anticipation <- trump %>%
  inner_join(nrc_anticipation) %>%
  count(word, sort = TRUE)
```

```
## Joining, by = "word"
```

There are not only more anticipation words, but there are also some anticipation words used more frequently, such as time and plan. This implies that Trump's agenda is filled with

```
trump_joy <- trump %>%
  inner_join(nrc_joy) %>%
  count(word, sort = TRUE)
```

```
## Joining, by = "word"
```

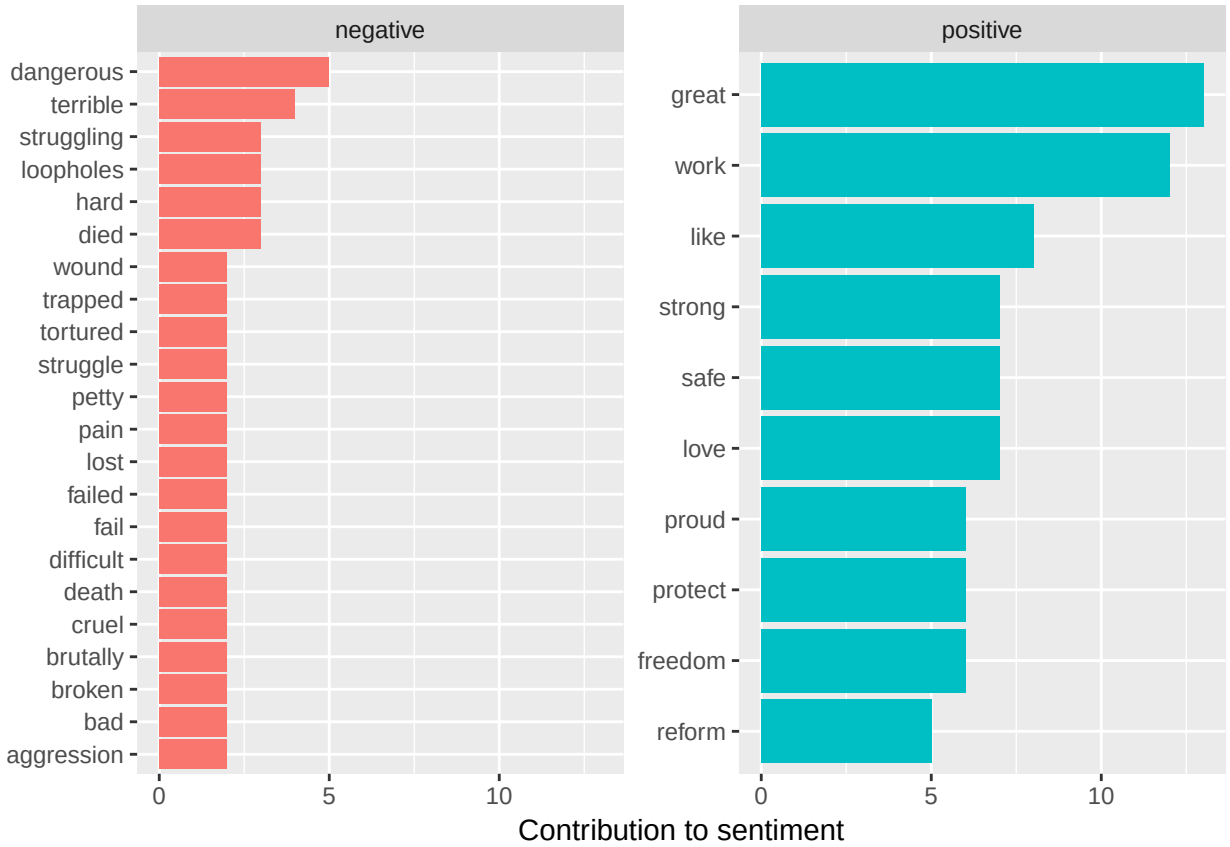
Despite what the media has said about Trump so far during his presidency, his state of the union address was has more words associated with joy than words associated with anger. However, there are plenty of words here that may have been taken out of context, such as finally, create, and yearning.

```
trump_bing <- trump %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  ungroup()
```

```
## Joining, by = "word"
```

```
trump_bing %>%
  group_by(sentiment) %>%
  top_n(10) %>%
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, n, fill = sentiment)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~sentiment, scales = "free_y") +
  labs(y = "Contribution to sentiment",
       x = NULL) +
  coord_flip()
```

```
## Selecting by n
```

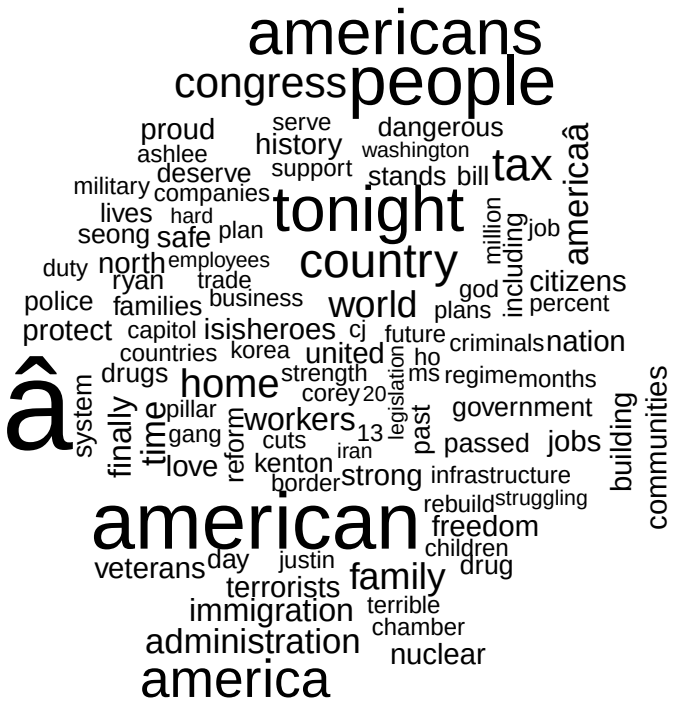


Here, we see that there are many more negative words than positive, but the most frequently used positive word, great, is used more than the most frequently used negative word, which is dangerous. This implies that Trump sees the current condition of the US in a bad light and is not very optimistic about the US' potential future. Like in the previous sentiment analyses, some words may have been taken out of context like reform.

Wordcloud for Trump's State of the Union Address

```
trump %>%
  anti_join(stop_words) %>%
  count(word) %>%
  with(wordcloud(word, n, max.words = 100))
```

```
## Joining, by = "word"
```



Wordcloud comparing positive and negative words in Trump's State of the Union Address

```
trump %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  acast(word ~ sentiment, value.var = "n", fill = 0) %>%
  comparison.cloud(colors = c("gray20", "gray80"),
                   max.words = 100)
```

```
## Joining, by = "word"
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): confidence could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): prosperity could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): supported could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): wonderful could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): crippled could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): depraved could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): enemies could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): enemy could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): epidemic could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): foolishly could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): grieving could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): hardship could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): menace could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): murder could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): pains could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): poorest could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): poverty could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): provocation could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): randomly could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): recession could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): savage could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): slashing could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): steal could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): surrender could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): threat could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): threaten could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): undermined could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): unlawful could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weakness could not be fit on page. It will not be plotted.
```

Nixon's State of the Union Address

```
nixon <- readtext("nixon first state of the union.txt")
nixon <- nixon %>% unnest_tokens(word,text)
```

```
nixon_anger <- nixon %>%
  inner_join(nrc_anger) %>%
  count(word, sort = TRUE)
```

```
## Joining, by = "word"
```

Simlar to Trump's state of the union address, there are not too many of Nixon's words associated with anger. Moreover, Nixon had way less words associated with anger than Trump in his State of the Union, which infers that Nixon had a more favorable outlook and attitude toward the US as well as leading the US to become a better nation.

```
nixon_anticipation <- nixon %>%
  inner_join(nrc_anticipation) %>%
  count(word, sort = TRUE)
```

```
## Joining, by = "word"
```

Like in Trump's address, Nixon's address has the word 'time' as the most frequently used word related to anticipation, but Nixon uses it even more than Trump, seventeen times to be exact, compared to nine times by Trump.

```
nixon_joy <- nixon %>%
  inner_join(nrc_joy) %>%
  count(word, sort = TRUE)
```

```
## Joining, by = "word"
```

Although Trump may have used more words relating to joy, Nixon's most frequent joy word, namely peace, is used sixteen times in his speech, as opposed to Trump's most frequent word, finally, which is used eight times and may not have necessarily been used in such a positive context. Moreover, there are less words associated with joy that are used only once in Nixon's speech than in Trump's speech, further implying that Nixon approached leading the US in a more optimistic way.

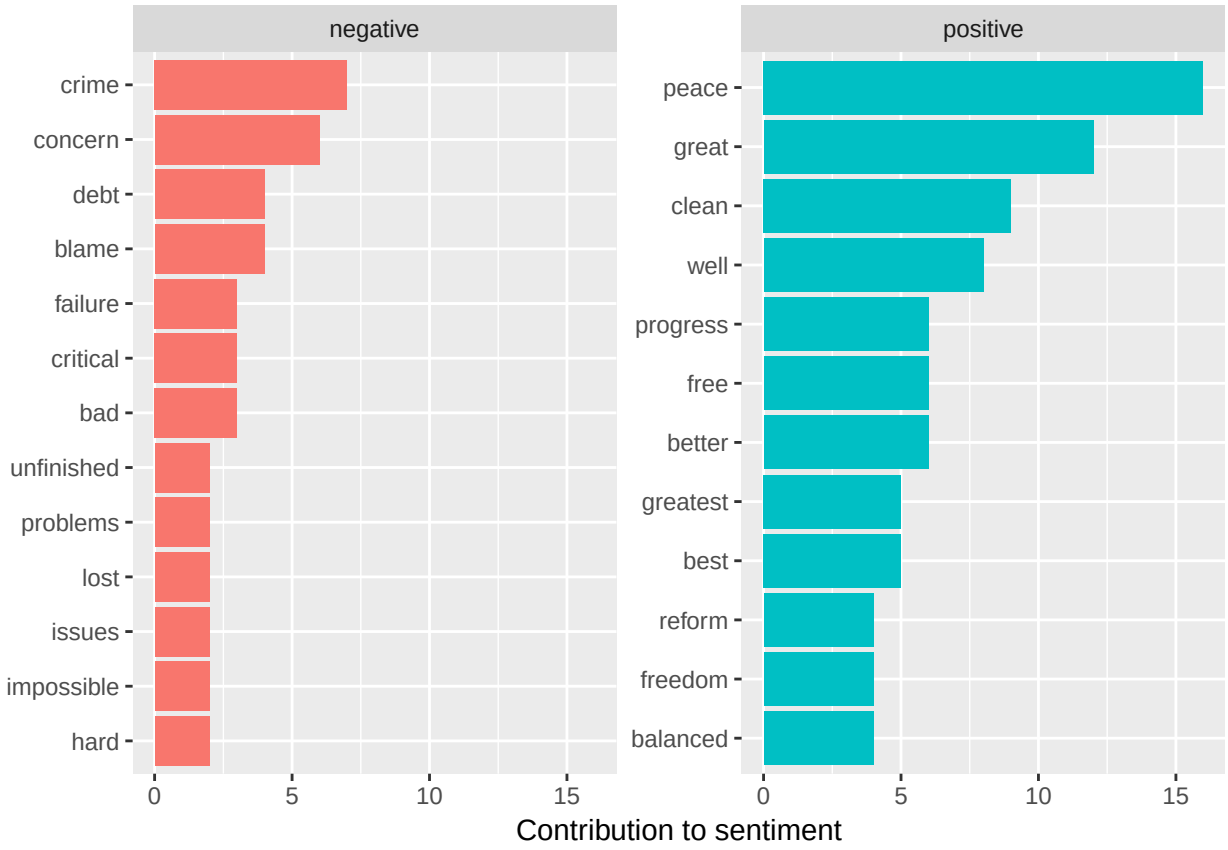
```
nixon_bing <- nixon %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  ungroup()
```

```
## Joining, by = "word"
```

```
nixon_bing %>%
  group_by(sentiment) %>%
  top_n(10) %>%
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, n, fill = sentiment)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~sentiment, scales = "free_y") +
  labs(y = "Contribution to sentiment",
```

```
       x = NULL) +
  coord_flip()
```

```
## Selecting by n
```



Unlike in Trump's State of the Union Address, where there were clearly more negative words used, Nixon's State of the Union Address has a relatively equal balance between positive and negative words. Therefore, we can infer that Nixon's agenda approached resolving the nation's issues with a more optimistic outlook, as opposed to Trump, who seems to really focus on the negative side of the nation's condition and has a little more pessimistic view on resolving the problems.

Wordcloud for Nixon's State of the Union Address

```
nixon %>%
  anti_join(stop_words) %>%
  count(word) %>%
  with(wordcloud(word, n, max.words = 100))
```

```
## Joining, by = "word"
```

```
## Warning in wordcloud(word, n, max.words = 100): america could not be fit on
## page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): people could not be fit on
## page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): peace could not be fit on
## page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): seventies could not be fit
## on page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): executive could not be fit
## on page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): challenge could not be fit
## on page. It will not be plotted.
```

Wordcloud comparing positive and negative words in Nixon's State of the Union Address

```
nixon %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  acast(word ~ sentiment, value.var = "n", fill = 0) %>%
  comparison.cloud(colors = c("gray20", "gray80"),
                   max.words = 100)
```

```
## Joining, by = "word"
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): lawlessness could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): limitations could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): murder could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): object could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): obsolete could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): overwhelmingly could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): problem could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): relentlessly could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): scarce could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): suffered could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): surrender could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): tragic could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): unbearable could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): urgent could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): violent could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): warning could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): waste could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weak could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weaken could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weakness could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): worst could not be fit on page. It will not be plotted.
```


negative
lengthy
garbage
doubt
gross
inability
forsake
disaster
conspicuous
concerned
burden
carelessness
dilapidated
dangerous
problems
lost
impossible
decayed
catastrophic
failure
critical
broken
stark
difficult
unrest
confrontation
abused
concern
contaminate
contradiction
strict
unfinished
bad
congestion
blame
crime
grim
damage
issues
costly
retreat
hard
concerns
issue
denied
breaks
noise
peace
fall
debt
delay
work
best
courage
celebrate
wisdom
richer
reform
better
great
clean
freedom
destiny
free
spiritual
balanced
support
genius
well
greatest
important
abundance
reforms
progress
success
dignity
profound
fresh
enhance
right
positive