Sentiment Analysis

EDP 618 Week 8

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Getting Prepped

Opening a Script Setting the working directory

1. Open up RStudio
2. Go to `File > New File > R Script`
3. Go to `File > Save As` and save the R Script in the same folder as the `csv` file. Name it whatever you want (e.g. **Week 7 R Walkthrough**)
4. Run the following command in your RStudio console

```
setwd(dirname(rstudioapi::getActiveDocumentContext()$path))
```

Loading Packages

Please load up the following packages by placing these at the top of your script

```
library(tidyverse)
library(tidytext)
library(textclean)
```

You may also want to put

```
setwd(dirname(rstudioapi::getActiveDocumentContext()$path))
```

below the packages so its there

Getting Data

We will be working with scripts from the first three seasons of the show *Rick and Morty*. Run the following to load the data

```
 rickmorty <- read_csv("RickAndMortyScripts.csv")
```

```
##
```

```
Rows: 1905 Columns: 6
##  [36mℹ [39m Rendering  ]8;;file:///Users/skynet/Documents/WVU/Teaching/GitHub.nosync/edp618/static/slides
##
```

```
##  [36mℹ [39m Rendering  ]8;;file:///Users/skynet/Documents/WVU/Teaching/GitHub.nosync/edp618/static/slides
```

```
── Column specification ────────────────────────────────────────
##  [36mℹ [39m Rendering  ]8;;file:///Users/skynet/Documents/WVU/Teaching/GitHub.nosync/edp618/static/slides
```

```
Delimiter: ","
## chr (3): episode name, name, line
## dbl (3): index, season no., episode no.
##
##  [36mℹ [39m Rendering  ]8;;file:///Users/skynet/Documents/WVU/Teaching/GitHub.nosync/edp618/static/slides
##
```

```
##
```

Assessing Data

We can take a look at the first ten rows of the data by running

```
head(rickmorty)
```

```
## # A tibble: 6 × 6
##   index `season no.` `episode no.` `episode name` name  line
##   <dbl>        <dbl>         <dbl> <chr>          <chr> <chr>
## 1     0            1             1 Pilot          Rick  Morty! You g…
## 2     1            1             1 Pilot          Morty What, Rick? …
## 3     2            1             1 Pilot          Rick  I got a surp…
## 4     3            1             1 Pilot          Morty It's the mid…
## 5     4            1             1 Pilot          Rick  Come on, I g…
## 6     5            1             1 Pilot          Morty Ow! Ow! You'…
```

We can also take a look at the types of columns by running

```
glimpse(rickmorty)
```

```
## Rows: 1,905
## Columns: 6
## $ index          <dbl> 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13…
## $ `season no.`   <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,…
## $ `episode no.`  <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,…
## $ `episode name` <chr> "Pilot", "Pilot", "Pilot", "Pilot", "Pilot",…
## $ name           <chr> "Rick", "Morty", "Rick", "Morty", "Rick", "M…
## $ line           <chr> "Morty! You gotta come on. Jus'... you gotta…
```

Wrangling Terms

Selecting Needed Columns

```
rickmorty_selected <-
  rickmorty %>%
  select(index, line)

rickmorty_selected
```

```
## # A tibble: 1,905 × 2
##    index line
##    <dbl> <chr>
##  1     0 Morty! You gotta come on. Jus'... you gotta come with me.
##  2     1 What, Rick? What’s going on?
##  3     2 I got a surprise for you, Morty.
##  4     3 It's the middle of the night. What are you talking about?
##  5     4 Come on, I got a surprise for you.  Come on, hurry up.
##  6     5 Ow! Ow! You're tugging me too hard!
##  7     6 We gotta go, gotta get outta here, come on. Got a surprise …
##  8     7 What do you think of this... flying vehicle, Morty? I built…
##  9     8 Yeah, Rick... I-it's great. Is this the surprise?
## 10     9 Morty. I had to... I had to do it. I had— I had to— I had t…
## # … with 1,895 more rows
```

Getting Rid of Common Terms

```
tidy_script <-
  rickmorty_selected %>%
  unnest_tokens(word, line) %>%
  anti_join(stop_words)
```

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

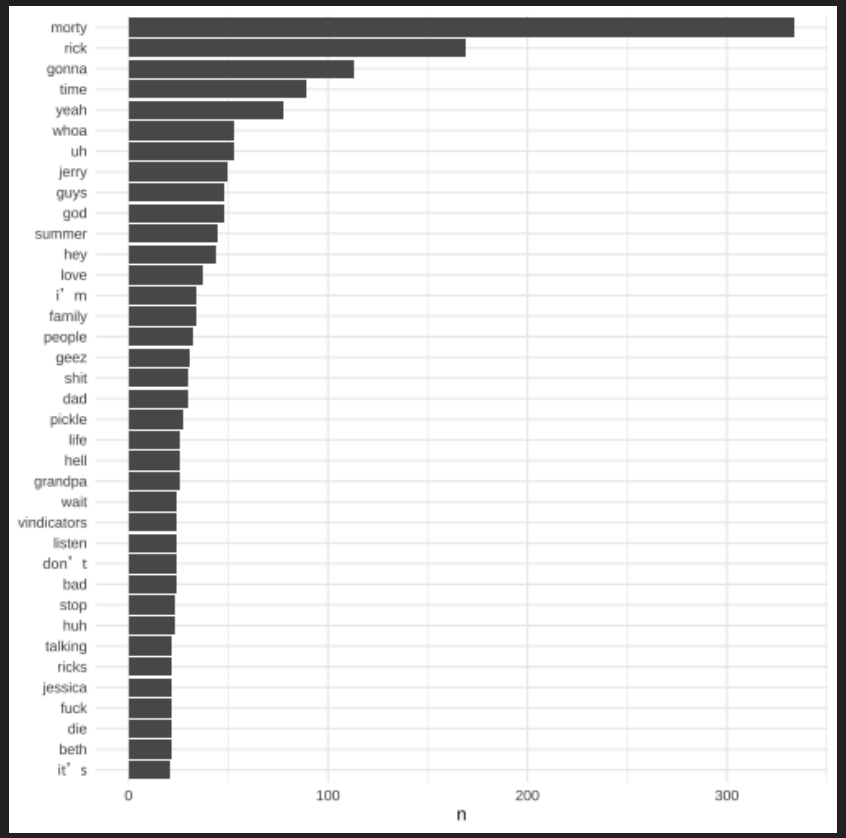
```
tidy_script
```

```
## # A tibble: 8,513 × 2
##    index word
##    <dbl> <chr>
##  1     0 morty
##  2     0 gotta
##  3     0 jus
##  4     0 gotta
##  5     1 rick
##  6     1 what’s
##  7     2 surprise
##  8     2 morty
##  9     3 middle
## 10     3 night
## # … with 8,503 more rows
```

```
tidy_script %>%
  count(word, sort = TRUE)
```

```
## # A tibble: 3,072 × 2
##    word      n
##    <chr> <int>
##  1 morty   334
##  2 rick    169
##  3 gonna   113
##  4 time     89
##  5 yeah     78
##  6 uh       53
##  7 whoa     53
##  8 jerry    50
##  9 god      48
## 10 guys     48
## # … with 3,062 more rows
```

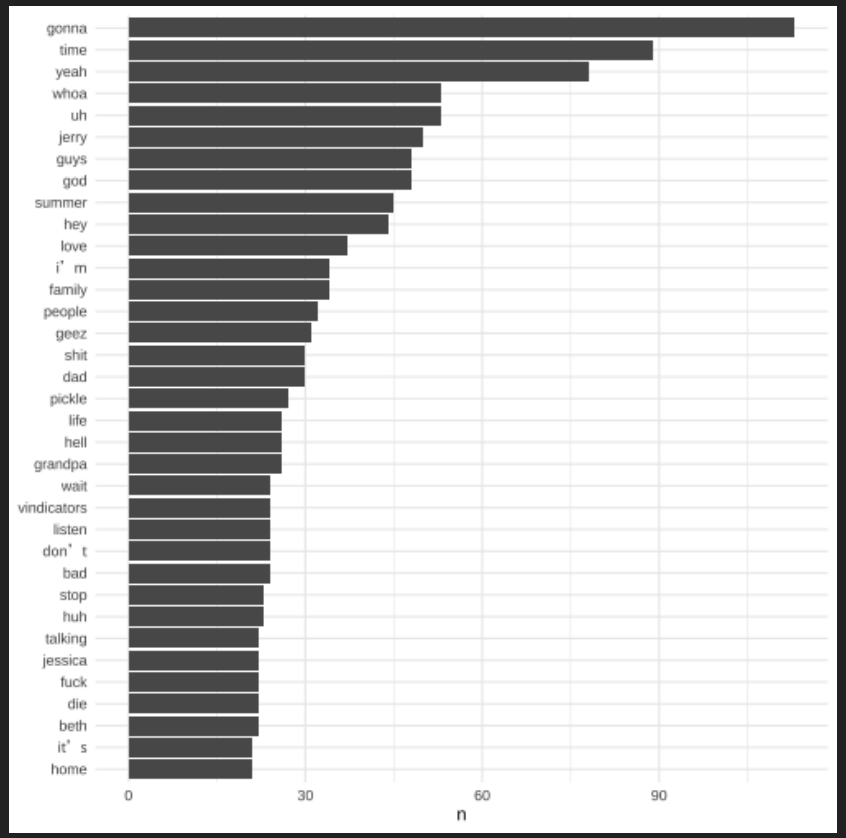
```r
tidy_script %>%
  count(word, sort = TRUE) %>%
  filter(n > 20) %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(n, word)) +
  geom_col() +
  labs(y = NULL) +
  theme_minimal()
```



```
rickmorty_selected %>%
mutate(line = str_remove_all(line, "Rick")) %>%
mutate(line = str_remove_all(line, "Morty")) %>%
mutate(line = replace_contraction(line)) %>%
unnest_tokens(word, line) %>%
anti_join(stop_words) %>%
count(word, sort = TRUE)
```

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

## # A tibble: 3,056 × 2
##    word        n
##    <chr>   <int>
##  1 gonna     113
##  2 time       89
##  3 yeah       78
##  4 uh         53
##  5 whoa       53
##  6 jerry      50
##  7 god        48
##  8 guys       48
##  9 summer     45
## 10 hey        44
## # … with 3,046 more rows
```

```r
rickandmorty_filtered %>%
  filter(n > 20) %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(n, word)) +
  geom_col() +
  labs(y = NULL) +
  theme_minimal()
```



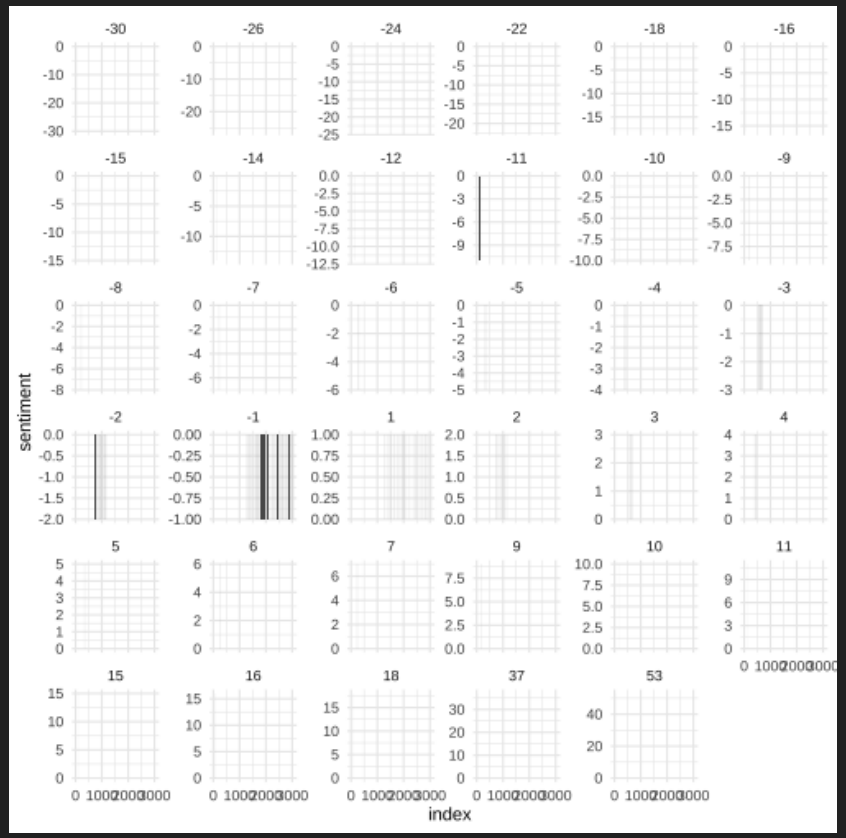
Sentiment Analysis

- is used to determine whether a given text contains negative, positive, or neutral emotions
- employs *Natural Language Processing* - computer program to understand human language as it is spoken and writte

```
rickandmorty_filtered %>%
  rowid_to_column(var = "index") %>%
  inner_join(get_sentiments("bing")) %>%
  pivot_wider(names_from = sentiment,
              values_from = n,
              values_fill = 0) %>%
  mutate(sentiment = positive - negative)
```

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

## # A tibble: 486 × 5
##    index word   positive negative sentiment
##    <int> <chr>     <int>    <int>     <int>
##  1     5 whoa         53        0        53
##  2    11 love         37        0        37
##  3    17 shit          0       30       -30
##  4    20 hell          0       26       -26
##  5    22 bad           0       24       -24
##  6    30 die           0       22       -22
##  7    31 fuck          0       22       -22
##  8    43 crap          0       18       -18
##  9    45 pretty       18        0        18
## 10    49 bitch         0       16       -16
## # … with 476 more rows
```

```r
ggplot(rickandmorty_bing,
       aes(index, sentiment)) +
  geom_bar(stat = "identity",
           show.legend = FALSE) +
  theme_minimal() +
  facet_wrap(~sentiment, scales = "free_y")
```



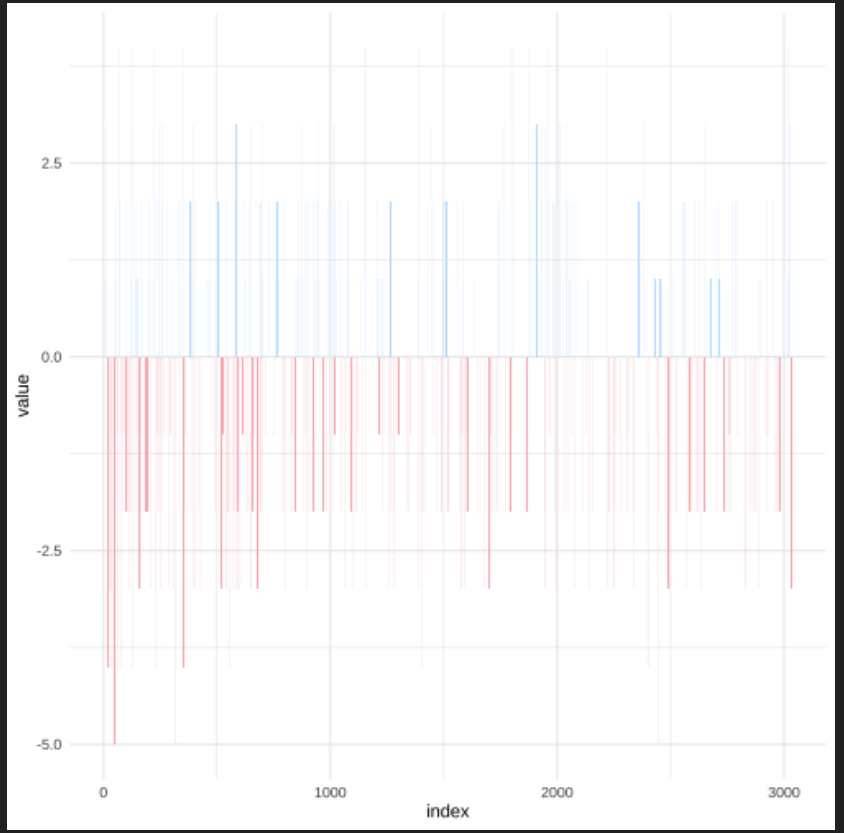
```
rickandmorty_filtered %>%
  rowid_to_column(var = "index") %>%
  inner_join(get_sentiments("afinn"))
```

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

## # A tibble: 420 × 4
##    index word      n value
##    <int> <chr> <int> <dbl>
##  1     3 yeah     78     1
##  2     7 god      48     1
##  3    11 love     37     3
##  4    17 shit     30    -4
##  5    20 hell     26    -4
##  6    22 bad      24    -3
##  7    28 stop     23    -1
##  8    30 die      22    -3
##  9    31 fuck     22    -4
## 10    43 crap     18    -3
## # … with 410 more rows
```

```
rickandmorty_filtered %>%
  rowid_to_column(var = "index") %>%
  inner_join(get_sentiments("afinn")) %>%
  mutate(sentiment = if_else(value > 0,
                             "positive",
                             "negative",
                             "NA"))
```

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

## # A tibble: 420 × 5
##    index word      n value sentiment
##    <int> <chr> <int> <dbl> <chr>
##  1     3 yeah     78     1 positive
##  2     7 god      48     1 positive
##  3    11 love     37     3 positive
##  4    17 shit     30    -4 negative
##  5    20 hell     26    -4 negative
##  6    22 bad      24    -3 negative
##  7    28 stop     23    -1 negative
##  8    30 die      22    -3 negative
##  9    31 fuck     22    -4 negative
## 10    43 crap     18    -3 negative
## # … with 410 more rows
```

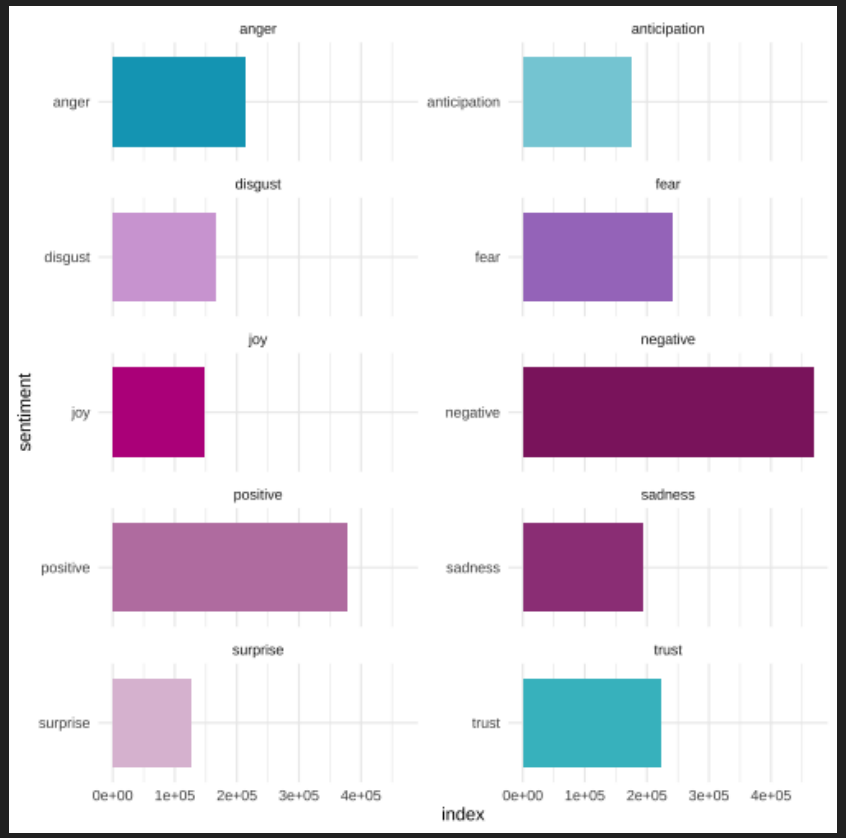
```
ggplot(rickandmorty_afinn_posneg,
       aes(index, value, fill = sentiment)) +
  geom_bar(stat = "identity",
           show.legend = FALSE) +
  theme_minimal() +
  scale_fill_manual(values = c("#ffb3ba", "#bae1ff"))
```



```
rickandmorty_filtered %>%
  rowid_to_column(var = "index") %>%
  inner_join(get_sentiments("nrc"))
```

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

## # A tibble: 1,707 × 4
##    index word      n sentiment
##    <int> <chr> <int> <chr>
##  1     2 time     89 anticipation
##  2     7 god      48 anticipation
##  3     7 god      48 fear
##  4     7 god      48 joy
##  5     7 god      48 positive
##  6     7 god      48 trust
##  7    11 love     37 joy
##  8    11 love     37 positive
##  9    17 shit     30 anger
## 10    17 shit     30 disgust
## # … with 1,697 more rows
```

```
ggplot(rickandmorty_nrc,
       aes(index, sentiment,
           fill = sentiment)) +
  geom_bar(stat = "identity",
           show.legend = FALSE) +
  theme_minimal() +
  facet_wrap(~sentiment, scales = "free_y",
             nrow = 5, ncol = 2) +
  scale_fill_manual(values = c("#05A4C0", "#85CEDA",
                               "#D2A7D8", "#A67BC5",
                               "#BB1C8B", "#8D266E",
                               "#BE82AF", "#9D4387",
                               "#DEC0D7", "#40BDC8",
                               "#80D3DB", "#BFE9ED"))
```



That's It!

Any questions?