Analysis

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This markdown is just an overview of the proccess that I used to get my information.

Data

I'm going to be pulling the covid numbers from the New York Times Github. They have total numbers of cases and deaths per county and per state.

```r
#https://github.com/nytimes/covid-19-data
setwd("C:/Users/Prashan.Welipitiya/Documents/Prashan/covid-19-data")
covid_states = read.csv("us-states.csv")
covid_states$date <- ymd(covid_states$date)
covid_counties = read.csv("us-counties.csv")
covid_counties$date <- ymd(covid_counties$date)

#head(covid_counties)

td_counties <- covid_counties %>% filter(date == max(covid_counties$date))
head(td_counties)
```

```
##         date  county   state fips cases deaths
## 1 2020-07-01 Autauga Alabama 1001   553     12
## 2 2020-07-01 Baldwin Alabama 1003   703     10
## 3 2020-07-01 Barbour Alabama 1005   326      1
## 4 2020-07-01    Bibb Alabama 1007   174      1
## 5 2020-07-01  Blount Alabama 1009   218      1
## 6 2020-07-01 Bullock Alabama 1011   367     10
```

I'm going to be using a dataset that was part of a homework assignments in an old class. This dataset has a lot of important information that I am curious about on counties in the US. It includes percent populations of 2016 voting information, elderly, black, white, hispanic, asian, education and income.

```r
county_votes16 <- readRDS(url("https://ericwfox.github.io/data/county_votes16.rds"))
#head(county_votes16)
```

```r
# To match the New York Times data, I'm going to add a collumn that changes the state abbreviation to t
county_votes16$state <- state.name[match(county_votes16$state,state.abb)]

# And take the word county out of the county names.
county_votes16$county <- as.character(county_votes16$county)
county_votes16$county <- substr(county_votes16$county,1,nchar(county_votes16$county) - 7)

head(county_votes16)
```

```
##     state  county clinton_pctvotes trump_pctvotes obama_pctvotes pct_pop65
## 1 Alabama Autauga            23.96          73.44          26.58      13.8
## 2 Alabama Baldwin            19.57          77.35          21.57      18.7
## 3 Alabama Barbour            46.66          52.27          51.25      16.5
## 4 Alabama    Bibb            21.42          76.97          26.22      14.8
## 5 Alabama  Blount             8.47          89.85          12.35      17.0
## 6 Alabama Bullock            75.09          24.23          76.31      14.9
##   pct_black pct_white pct_hispanic pct_asian highschool bachelors income
## 1      18.7      77.9          2.7       1.1       85.6      20.9 53.682
## 2       9.6      87.1          4.6       0.9       89.1      27.7 50.221
## 3      47.6      50.2          4.5       0.5       73.7      13.4 32.911
## 4      22.1      76.3          2.1       0.2       77.5      12.1 36.447
## 5       1.8      96.0          8.7       0.3       77.0      12.1 44.145
## 6      70.1      26.9          7.5       0.3       67.8      12.5 32.033
##   trump_win
## 1         1
## 2         1
## 3         1
## 4         1
## 5         1
## 6         0
```

```
covid = merge(td_counties, county_votes16)
head(covid)
```

```
##      county          state       date  fips cases deaths clinton_pctvotes
## 1 Abbeville South Carolina 2020-07-01 45001   113      0            34.61
## 2    Acadia      Louisiana 2020-07-01 22001   919     37            20.59
## 3  Accomack       Virginia 2020-07-01 51001  1043     14            42.76
## 4       Ada          Idaho 2020-07-01 16001  2288     23            38.69
## 5     Adair           Iowa 2020-07-01 19001    15      0            29.98
## 6     Adair       Kentucky 2020-07-01 21001   126     19            16.08
##   trump_pctvotes obama_pctvotes pct_pop65 pct_black pct_white pct_hispanic
## 1          62.87          42.61      19.4      28.3      69.7          1.2
## 2          77.26          24.44      13.5      18.3      79.6          2.2
## 3          54.47          47.77      21.3      28.1      68.8          8.9
## 4          47.93          42.72      12.6       1.3      92.4          7.7
## 5          65.34          45.16      22.1       0.4      98.2          1.7
## 6          80.66          21.84      16.4       3.0      95.1          1.9
##   pct_asian highschool bachelors income trump_win
## 1       0.4       76.8      12.2 35.947         1
## 2       0.4       72.1      10.2 37.587         1
## 3       0.7       78.0      17.2 39.328         1
## 4       2.6       93.6      36.0 55.210         1
## 5       0.5       90.7      16.3 47.892         1
## 6       0.3       73.7      13.9 32.524         1
```

I need to add population data. I'm getting this from census.gov (https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html#par_textimage_70769902)

```
pop = read.csv('https://www2.census.gov/programs-surveys/popest/datasets/2010-2019/counties/totals/co-e
```

```r
# I just want the county info, state name and population.
pop19 <- subset(pop, select = c(COUNTY,STNAME,CTYNAME,POPESTIMATE2019))

# County number of 0 is the state population so I'm going to take that out for now.
popCounty <- pop19 %>%
  filter(COUNTY != 0)

# Change headers to match

popCounty <- popCounty %>% rename(ID = COUNTY)
popCounty <- popCounty %>% rename(state = STNAME)
popCounty <- popCounty %>% rename(county = CTYNAME)
popCounty <- popCounty %>% rename(popEst19 = POPESTIMATE2019)

# Take the word county out again
popCounty$county <- substr(popCounty$county,1,nchar(popCounty$county) - 7)

head(popCounty)
```

```
##   ID   state  county popEst19
## 1  1 Alabama Autauga    55869
## 2  3 Alabama Baldwin   223234
## 3  5 Alabama Barbour    24686
## 4  7 Alabama    Bibb    22394
## 5  9 Alabama  Blount    57826
## 6 11 Alabama Bullock    10101
```

```r
covid <- merge(popCounty, covid)
```

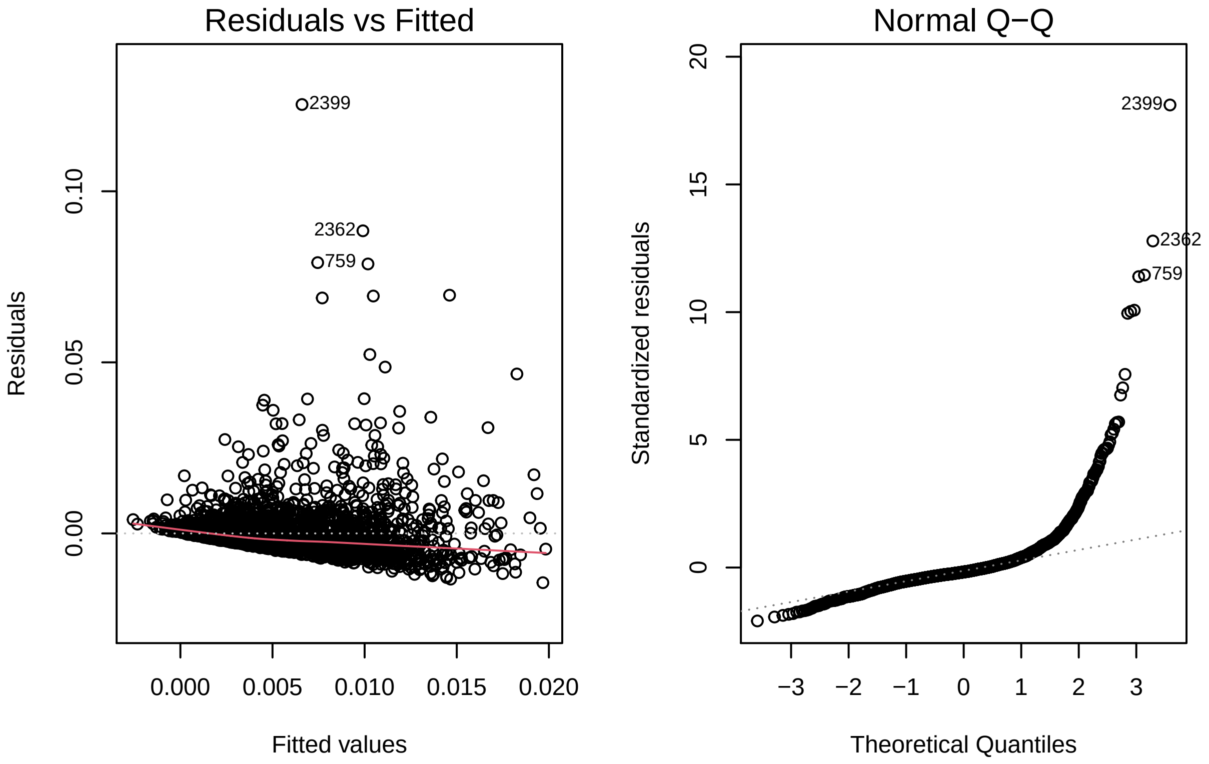
```r
covid$pct_cases <- covid$cases/covid$popEst19
covid$pct_deaths <- covid$deaths/covid$popEst19
head(covid)
```

```
##     state  county ID popEst19       date fips cases deaths clinton_pctvotes
## 1 Alabama Autauga  1    55869 2020-07-01 1001   553     12            23.96
## 2 Alabama Baldwin  3   223234 2020-07-01 1003   703     10            19.57
## 3 Alabama Barbour  5    24686 2020-07-01 1005   326      1            46.66
## 4 Alabama    Bibb  7    22394 2020-07-01 1007   174      1            21.42
## 5 Alabama  Blount  9    57826 2020-07-01 1009   218      1             8.47
## 6 Alabama Bullock 11    10101 2020-07-01 1011   367     10            75.09
##   trump_pctvotes obama_pctvotes pct_pop65 pct_black pct_white pct_hispanic
## 1          73.44          26.58      13.8      18.7      77.9          2.7
## 2          77.35          21.57      18.7       9.6      87.1          4.6
## 3          52.27          51.25      16.5      47.6      50.2          4.5
## 4          76.97          26.22      14.8      22.1      76.3          2.1
## 5          89.85          12.35      17.0       1.8      96.0          8.7
## 6          24.23          76.31      14.9      70.1      26.9          7.5
##   pct_asian highschool bachelors income trump_win   pct_cases   pct_deaths
## 1       1.1       85.6      20.9 53.682         1 0.009898155 2.147882e-04
## 2       0.9       89.1      27.7 50.221         1 0.003149162 4.479604e-05
## 3       0.5       73.7      13.4 32.911         1 0.013205866 4.050879e-05
## 4       0.2       77.5      12.1 36.447         1 0.007769938 4.465482e-05
## 5       0.3       77.0      12.1 44.145         1 0.003769930 1.729326e-05
## 6       0.3       67.8      12.5 32.033         0 0.036333036 9.900010e-04
```

```
lm1 <- lm(pct_cases~trump_pctvotes + pct_pop65 + pct_black + pct_white + pct_hispanic + pct_asian + hig
summary(lm1)
```

```
##
## Call:
## lm(formula = pct_cases ~ trump_pctvotes + pct_pop65 + pct_black +
##     pct_white + pct_hispanic + pct_asian + highschool + bachelors +
##     income, data = covid)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.014400 -0.002780 -0.001189  0.001034  0.125355
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     2.987e-02  3.219e-03   9.281  < 2e-16 ***
## trump_pctvotes -4.342e-05  1.275e-05  -3.407 0.000667 ***
## pct_pop65      -1.528e-04  3.504e-05  -4.361 1.34e-05 ***
## pct_black       1.041e-04  2.026e-05   5.137 2.97e-07 ***
## pct_white      -4.337e-05  1.940e-05  -2.235 0.025470 *
## pct_hispanic    3.404e-05  1.247e-05   2.730 0.006369 **
## pct_asian       1.915e-05  6.844e-05   0.280 0.779664
## highschool     -2.437e-04  3.348e-05  -7.279 4.28e-13 ***
## bachelors      -3.833e-05  2.670e-05  -1.436 0.151235
## income          1.016e-04  1.784e-05   5.696 1.34e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.006926 on 2965 degrees of freedom
## Multiple R-squared:  0.2066, Adjusted R-squared:  0.2042
## F-statistic:  85.8 on 9 and 2965 DF,  p-value: < 2.2e-16
```

```
par(mfrow=c(1,2), cex=0.75)
plot(lm1, (1:2))
```


Residuals vs Fitted
Residuals
Fitted values
0.00
0.05
0.10
0.000
0.005
0.010
0.015
0.020
2399
2362
759
Normal Q−Q
Standardized residuals
Theoretical Quantiles
0
5
10
15
20
−3
−2
−1
0
1
2
3
2399
2362
759