Report for Apprehensions at the US-Mexico border from 2000 to 2017

1.Comparation between 2010 and 2017

2.The statistical tests

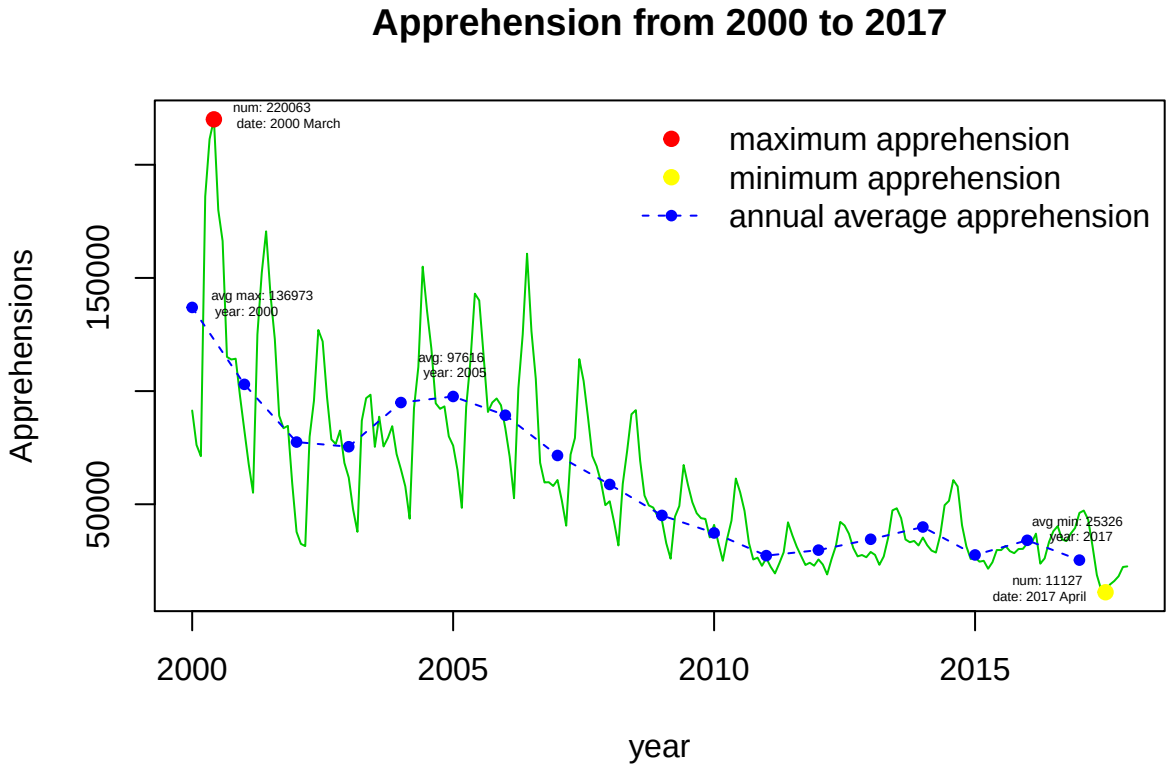
3.The apprehensions change from 2000 to 2017

As what is shown in the graph below. Apprehensions at the US-Mexico border reached its historic lows in the 2017 and shows a downward trend since 2000. Dropping a the way from its peak of 220063 in 2000 to its bottom as 11127, nearly 2000% decline.

As for the annual average apprehension, we can see it has been dropped from 136973 in 2000 to 25326 in 2017. Though raised a little bit in 2005 to 97616, it went all the way down to 25326 in 2017.

```
#load, clean and rerrange the data
ts<-read.csv("PB monthly summaries.csv")
rownames(ts) <- ts[,1]
ts <- ts[order(ts$year),]
ts<-subset(ts,select=-year)

#turn it into timeseries format
ts_df<-ts
ts <- as.vector(t(ts))
ts<-ts(ts,start = c(2000,1), frequency=12)

#plot the timeseries data
ts.plot(ts,
        col = 3,
        xlab="year",
        ylab="Apprehensions",
        lty=c(1:3),
        main ="Apprehension from 2000 to 2017")

#draw the avg
ts_avg<-apply(ts_df,1,mean)
ts_avg<-ts(ts_avg,start = c(2000), frequency=1)
points(ts_avg,col = 4,pch=20)
lines(ts_avg,col = 4,pch=20,lty=2)

#get the max/min month index
pos_max<-which(ts_df == max(ts_df), arr.ind=T)
pos_min<-which(ts_df == min(ts_df), arr.ind=T)

#get the month vector
month<-c("October","November","December","January","February","March","April","May","June","July","Augus

#get the exact time point of the maximum/minimum element in timeseries data
max_index <- time(ts)[ts==max(ts)]
min_index <- time(ts)[ts==min(ts)]
max_avg <- time(ts_avg)[ts_avg==max(ts_avg)]
```

```
min_avg <- time(ts_avg)[ts_avg==min(ts_avg)]

#label the maximum/minimum apprehension in the graph
text(max_index,max(ts),
     paste("num:",max(ts),"\n","date:",floor(max_index),month[as.vector(pos_max)[2]]),
     cex=0.4,pos=4)
text(min_index,min(ts),
     paste("num:",min(ts),"\n","date:",floor(min_index),month[as.vector(pos_min)[2]]),
     cex=0.4,pos=2)
text(max_avg,
     max(ts_avg),
     paste("avg max:",floor(max(ts_avg)),"\n","year:",floor(max_avg)),
     cex=0.4,
     pos=4)
text(min_avg,
     min(ts_avg),
     paste("avg min:",floor(min(ts_avg)),"\n","year:",floor(min_avg)),
     cex=0.4,
     pos=3)
text(2005,
     ts_avg[time(ts_avg)==2005],
     paste("avg:",floor(ts_avg[time(ts_avg)==2005]),"\n","year:",2005),
     cex=0.4,
     pos=3)

#pinpoint the maximum/minimum apprehension in the graph
points(max_index,max(ts),pch=19,col=2)
points(min_index,min(ts),pch=19,col=7)

#add a legend which denotes the meaning of the points
legend("topright",
       c("maximum apprehension",
         "minimum apprehension",
         "annual average apprehension"),
       col = c(2,7,4),
       pch =c(19,19,20),
       lty=c(0,0,2),
       bty = "n",
       bg = 'gray90')
```


Apprehension from 2000 to 2017
num: 220063
date: 2000 March
maximum apprehension
minimum apprehension
annual average apprehension
avg max: 136973
year: 2000
avg: 97616
year: 2005
avg min: 25326
year: 2017
num: 11127
date: 2017 April
Apprehensions
50000
150000
2000
2005
2010
2015
year