

# SEJ Analytix: Generate the map of the CC2 results for the daily traffic in 2020

Based on numerically coding the COVID19 policies and times series cross correlation

#Clear the space

```
rm(list = ls())
```

## Introduction and Data

This code creates a map of the results from the cross correlation time-series modeling, to be accessed from a User Interface.

The state cumulative daily traffic was computed and imputed by SEJ Analytix from the original data at

<https://www.fhwa.dot.gov/policyinformation/tables/tmasdata/>.

(<https://www.fhwa.dot.gov/policyinformation/tables/tmasdata/>.)

The COVID19 state policies were extracted and from

[https://en.wikipedia.org/wiki/U.S.\\_state\\_and\\_local\\_government\\_responses\\_to\\_the\\_COVID19\\_pandemic](https://en.wikipedia.org/wiki/U.S._state_and_local_government_responses_to_the_COVID19_pandemic)

([https://en.wikipedia.org/wiki/U.S.\\_state\\_and\\_local\\_government\\_responses\\_to\\_the\\_COVID19\\_pandemic](https://en.wikipedia.org/wiki/U.S._state_and_local_government_responses_to_the_COVID19_pandemic))

<https://www.nytimes.com/interactive/2020/us/states-reopen-map-coronavirus.html>

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The FIPS.State.Code - numeric and USPS codes for state were extracted from

<https://www.bls.gov/respondents/mwr/electronic-data-interchange/appendix-d-usps-state-abbreviations-and-fips-codes.htm>

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The Covid19 state policies were numerically coded with reference to the state specific traffic.

The files loaded are lists of lists.

Below find examples of how to access the information in each file loaded.

#cc2TrafficPrior[[1]][[FIPSCode]] = lag between traffic change and prior year change

#cc2TrafficPrior[[2]][[FIPSCode]] = CC2 model diff(traffic)~diff(prior) for plotting

#cc2TrafficPrior[[3]][[FIPSCode]] = CC2F value, with NA if no association with the prior state traffic

#cc2Emer[[1]][[FIPSCode]] = lag between Traffic change and the COVID19 policies

#cc2Emer[[2]][[FIPSCode]] = CC2 model diff(Traffic)~diff(COVID19 policies) for plotting

#cc2Emer[[3]][[FIPSCode]] = CC2F value, with NA if no association with that COVID19 policy

```
setwd("C:/Users/Mama/Desktop/Customer_cases/CovidOnTransportation")
```

## Load packages

```
require(tidyverse)
```

```
## Loading required package: tidyverse
```

```
## Warning: package 'tidyverse' was built under R version 4.3.3
```

```
## Warning: package 'ggplot2' was built under R version 4.3.3
```

```
## Warning: package 'tibble' was built under R version 4.3.3
```

```
## Warning: package 'tidyr' was built under R version 4.3.3
```

```
## Warning: package 'readr' was built under R version 4.3.3
```

```
## Warning: package 'purrr' was built under R version 4.3.3
```

```
## Warning: package 'dplyr' was built under R version 4.3.3
```

```
## Warning: package 'stringr' was built under R version 4.3.3
```

```
## Warning: package 'forcats' was built under R version 4.3.3
```

```
## Warning: package 'lubridate' was built under R version 4.3.3
```

```
## — Attaching core tidyverse packages ————— tidyverse 2.0.0 —
## ✓ dplyr      1.1.4      ✓ readr      2.1.5
## ✓ forcats   1.0.0      ✓ stringr    1.5.1
## ✓ ggplot2   3.5.1      ✓ tibble     3.2.1
## ✓ lubridate 1.9.3      ✓ tidyr      1.3.1
## ✓ purrr     1.0.2
```

```
## — Conflicts ————— tidyverse_conflicts() —
## ✗ dplyr::filter() masks stats::filter()
## ✗ dplyr::lag()     masks stats::lag()
## ! Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

Load files.

```
files_to_load <- c("cc2TrafficPrior.R", "cc2Emer.R", "cc2Lock.R", "cc2Trv.R", "cc2Cls.R")

for (file in files_to_load) {
  load(file)
}
```

Read files.

```
tableCovid<-read.table("C:/Users/Mama/Desktop/Customr_cases/CovidOnTransportation/lockdownsUS.txt", header=T, all=T)
```

```
allStateCodes<-unique(tableCovid$FIPS.State.Code)
```

Make state info and store it

```
stateInfo<-list()
for (FIPSCode in allStateCodes) {
  state<-tableCovid %>% dplyr::filter(FIPS.State.Code == FIPSCode)

  name <-state$stateName
  abbr<- state$State
  lock<-state$StartLock
  trv<-state$OutState
  cls<-state$ClsStores
  assocPrior<-cc2TrafficPrior[[3]][[FIPSCode]]
  assocEmer<-cc2Emer[[3]][[FIPSCode]]
  assocLock<-cc2Lock[[3]][[FIPSCode]]
  assocTrv<-cc2Trv[[3]][[FIPSCode]]
  assocCls<-cc2Cls[[3]][[FIPSCode]]

  stateInfo[[FIPSCode]]<-tibble(State_Name=name,State_Code=abbr, Start_Lock=as.character(lock),Travel_Ban=as.character(trv), Closed_Stores=as.character(cls), cc_Prior=as.character(assocPrior), cc_Emergency=as.character(assocEmer),cc_LockDown=as.character(assocLock), cc_TravelBan= as.character(assocTrv), cc_Stores=as.character(assocCls))
}

allStateInfo<-bind_rows(stateInfo)
cc2Info<-allStateInfo%>% mutate(across(c(cc_Prior, cc_Emergency, cc_LockDown, cc_TravelBan, cc_Stores), ~ substr(., 1, 6)))

stateInfo<-as.data.frame(cc2Info)
save(stateInfo, file="stateInfo.R")
stateInfo
```

##	State_Name	State_Code	Start_Lock	Travel_Ban	Closed_Stores	cc_Prior
## 1	Alabama	AL	4/4/2020	N	Y	0.3352
## 2	Alaska	AK	3/28/2020	Y	Y	0.3595
## 3	Arizona	AZ	3/31/2020	Y	Y	0.3046
## 4	Arkansas	AR	N	N	R	0.6002
## 5	California	CA	3/19/2020	N	Y	0.3150
## 6	Colorado	CO	3/26/2020	N	Y	0.3937
## 7	Connecticut	CT	3/23/2020	R	Y	-0.276
## 8	Delaware	DE	3/24/2020	Y	Y	0.4450
## 9	District_Columbia	DC	4/1/2020	N	Y	0.3560
## 10	Florida	FL	4/3/2020	R	Y	1.2289
## 11	Georgia	GA	4/3/2020	N	Y	0.7965
## 12	Hawaii	HI	3/25/2020	Y	Y	0.4953
## 13	Idaho	ID	3/25/2020	Y	R	0.3484
## 14	Illinois	IL	3/21/2020	N	Y	0.5173
## 15	Indiana	IN	3/25/2020	N	Y	0.3758
## 16	Iowa	IA	N	N	Y	0.6945
## 17	Kansas	KS	3/30/2020	R	Y	0.5243
## 18	Kentucky	KY	R	Y	Y	0.3627
## 19	Louisiana	LA	3/23/2020	N	Y	-0.381
## 20	Maine	ME	4/2/2020	Y	R	0.2380
## 21	Maryland	MD	3/30/2020	Y	Y	0.5245
## 22	Massachusetts	MA	3/24/2020	Y	Y	1.1884
## 23	Michigan	MI	3/24/2020	N	Y	0.3874
## 24	Minnesota	MN	3/27/2020	N	Y	0.1572
## 25	Mississippi	MS	4/3/2020	N	Y	0.4662
## 26	Missouri	MO	4/6/2020	R	Y	0.4076
## 27	Montana	MN	3/28/2020	Y	Y	0.6230
## 28	Nebraska	NE	N	R	N	0.5547
## 29	Nevada	NV	4/1/2020	Y	Y	0.5700
## 30	New_Hampshire	NH	3/27/2020	Y	Y	0.1955
## 31	New_Jersey	NJ	3/21/2020	N	Y	0.7103
## 32	New_Mexico	NM	3/24/2020	Y	Y	0.2202
## 33	New_York	NY	3/20/2020	N	Y	0.4675
## 34	North_Carolina	NC	3/30/2020	N	Y	0.2631
## 35	North_Dakota	ND	N	Y	Y	1.1202
## 36	Ohio	OH	3/23/2020	Y	Y	0.5586
## 37	Oklahoma	OK	4/1/2020	R	Y	0.5789
## 38	Oregon	OR	3/23/2020	N	R	0.6352
## 39	Pennsylvania	PA	4/1/2020	R	Y	1.0594
## 40	Rhode_Island	RI	3/28/2020	Y	Y	-0.102
## 41	South_Carolina	SC	4/6/2020	R	Y	1.1252
## 42	South_Dakota	SD	R	R	N	0.4550
## 43	Tennessee	TN	3/12/2020	N	Y	NA
## 44	Texas	TX	4/2/2020	R	Y	0.5544
## 45	Utah	UT	R	N	R	0.3555
## 46	Vermont	VT	3/24/2020	Y	Y	0.2925
## 47	Virginia	VA	3/23/2020	N	R	0.3582
## 48	Washington	WA	3/24/2020	N	Y	1.0432
## 49	West_Virginia	WV	3/24/2020	N	Y	0.3142
## 50	Wisconsin	WI	3/25/2020	Y	Y	0.4381
## 51	Wyoming	WY	R	Y	N	0.1486

##	cc_Emergency	cc_LockDown	cc_TravelBan	cc_Stores
## 1	-0.052	0.0454	NA	0.0870
## 2	-0.201	NA	0.3821	0.2845
## 3	-0.026	NA	0.0568	0.0387
## 4	-0.615	NA	NA	NA
## 5	-0.032	NA	NA	0.0582
## 6	-0.131	-0.090	NA	0.2175
## 7	-0.289	NA	1.5168	0.4204
## 8	-0.204	NA	0.4527	0.3055
## 9	-2.108	NA	NA	3.5086
## 10	-0.026	-0.018	0.3423	0.0401
## 11	-0.030	NA	NA	0.0503
## 12	-0.130	0.1225	0.4109	0.2160
## 13	-0.111	NA	0.3272	1.6436
## 14	-0.138	NA	NA	0.2144
## 15	-0.157	0.1047	NA	0.2412
## 16	-0.200	NA	NA	NA
## 17	-0.460	NA	-3.415	0.7743
## 18	-0.239	NA	NA	NA
## 19	-0.448	0.3965	NA	0.6444
## 20	-0.344	NA	0.8363	1.9748
## 21	-0.127	NA	0.3976	0.2117
## 22	-0.019	NA	0.0380	0.0278
## 23	-0.086	NA	NA	0.1358
## 24	-0.744	NA	NA	1.4283
## 25	-0.158	NA	NA	0.2432
## 26	-0.159	NA	2.8857	0.2453
## 27	-0.578	NA	1.3196	0.8730
## 28	-0.365	NA	NA	NA
## 29	-0.090	0.0615	0.1926	0.1337
## 30	-0.180	NA	0.6086	0.3047
## 31	-0.073	-0.060	NA	0.1109
## 32	-0.644	NA	1.7792	1.0315
## 33	-0.153	-0.134	NA	0.2753
## 34	-0.098	0.0873	NA	0.1485
## 35	-0.840	NA	NA	NA
## 36	-0.059	0.0393	0.1818	0.0973
## 37	-0.132	0.0899	1.7963	0.2029
## 38	-0.122	-0.099	NA	-1.228
## 39	-0.125	0.0868	0.8212	0.1853
## 40	-0.096	NA	0.1895	0.1385
## 41	-0.056	0.0389	1.9807	0.0882
## 42	-0.808	NA	NA	NA
## 43	-0.066	-0.043	NA	0.1011
## 44	-0.043	0.0300	-0.565	0.0713
## 45	-0.081	NA	NA	NA
## 46	0.8715	NA	2.1978	1.1978
## 47	-0.020	0.0136	NA	-11.74
## 48	0.0382	NA	NA	0.0495
## 49	-0.607	NA	NA	0.8622
## 50	-0.050	0.0355	0.1306	0.0795
## 51	-0.295	NA	NA	NA