고뇌하는 4조

정권상

시험 끝 오후 4:55

정권상

이제

세상에 존재하지 않을 것이므로 오후 4:55

하민진

안돼 권상아.. 오후 4:56

주일찬

4차 놓을 거? 오후 4:56

하민진

일어나봐.. 오후 4:56

정권상

na로 처리해주세요 오후 4:56

하민진

eda 해야지.. 오후 4:56

고뇌하는 4조

범죄는
어디서 얼마나
일어나는가
In America

E D A

역할분담

곽현지

신혜연

“클러스터링”

장은수

주일찬

“데이터 클린징
& PPT 제작”

하민진

정권상

“Feature Engineering”

목 차

1

A GLANCE

2

DATA CLEANSING

3

CLUSTERING

TRANSFORMATION

1

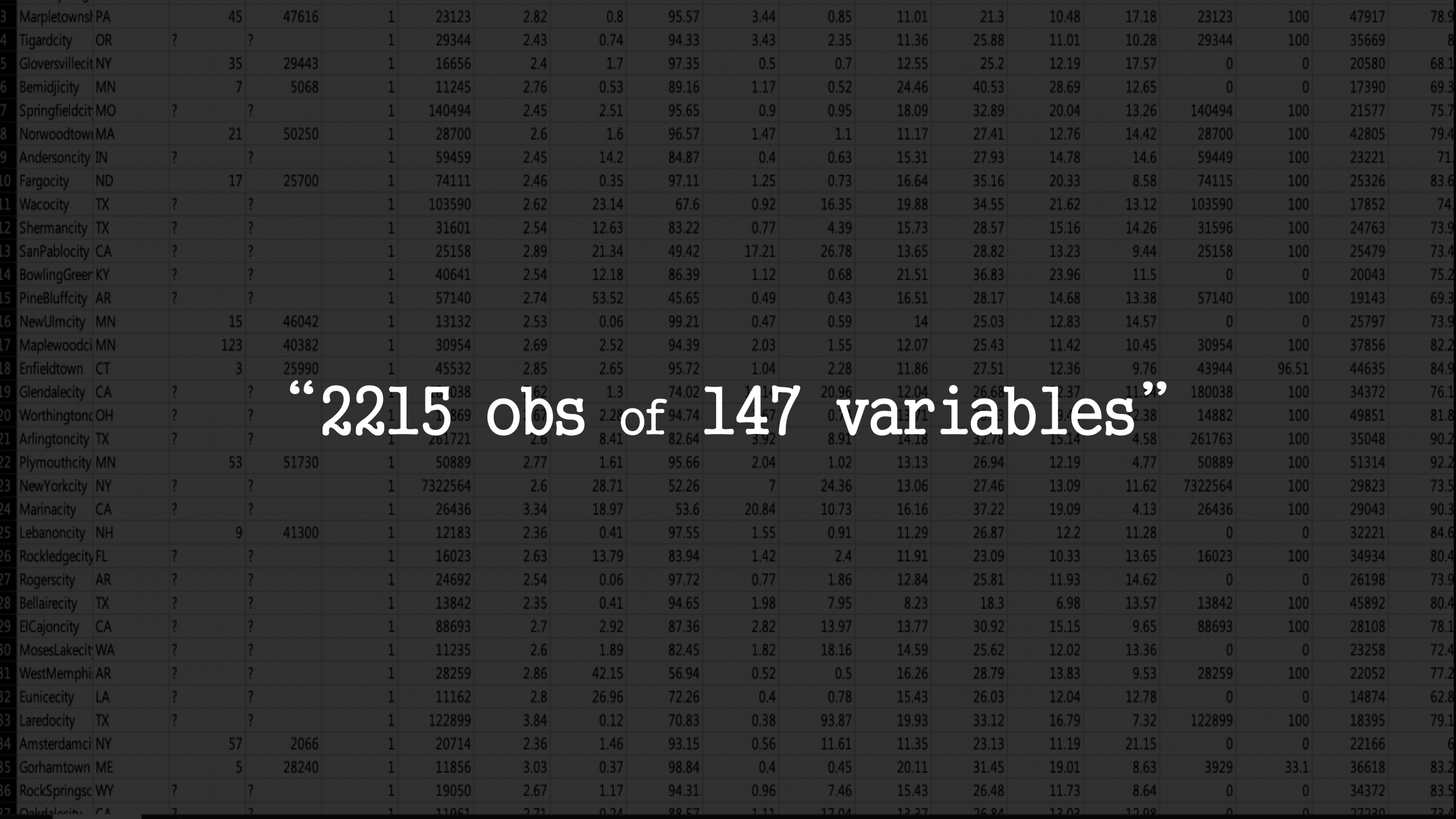
탐색전 : 데이터 둘러보기

1

“쓱-”

1

3	Marpletownsh	PA	45	47616	1	23123	2.82	0.8	95.57	3.44	0.85	11.01	21.3	10.48	17.18	23123	100	47917	78.9
4	Tigardcity	OR	?	?	1	29344	2.43	0.74	94.33	3.43	2.35	11.36	25.88	11.01	10.28	29344	100	35669	8
5	Gloversvillecit	NY	35	29443	1	16656	2.4	1.7	97.35	0.5	0.7	12.55	25.2	12.19	17.57	0	0	20580	68.1
6	Bemidjicity	MN	7	5068	1	11245	2.76	0.53	89.16	1.17	0.52	24.46	40.53	28.69	12.65	0	0	17390	69.3
7	Springfieldcit	MO	?	?	1	140494	2.45	2.51	95.65	0.9	0.95	18.09	32.89	20.04	13.26	140494	100	21577	75.7
8	Norwoodtow	MA	21	50250	1	28700	2.6	1.6	96.57	1.47	1.1	11.17	27.41	12.76	14.42	28700	100	42805	79.4
9	Andersoncity	IN	?	?	1	59459	2.45	14.2	84.87	0.4	0.63	15.31	27.93	14.78	14.6	59449	100	23221	71.
10	Fargocity	ND	17	25700	1	74111	2.46	0.35	97.11	1.25	0.73	16.64	35.16	20.33	8.58	74115	100	25326	83.6
11	Wacocity	TX	?	?	1	103590	2.62	23.14	67.6	0.92	16.35	19.88	34.55	21.62	13.12	103590	100	17852	74.
12	Shermancity	TX	?	?	1	31601	2.54	12.63	83.22	0.77	4.39	15.73	28.57	15.16	14.26	31596	100	24763	73.9
13	SanPablocity	CA	?	?	1	25158	2.89	21.34	49.42	17.21	26.78	13.65	28.82	13.23	9.44	25158	100	25479	73.4
14	BowlingGreer	KY	?	?	1	40641	2.54	12.18	86.39	1.12	0.68	21.51	36.83	23.96	11.5	0	0	20043	75.2
15	PineBluffcity	AR	?	?	1	57140	2.74	53.52	45.65	0.49	0.43	16.51	28.17	14.68	13.38	57140	100	19143	69.3
16	NewUlmcity	MN	15	46042	1	13132	2.53	0.06	99.21	0.47	0.59	14	25.03	12.83	14.57	0	0	25797	73.9
17	Maplewoodci	MN	123	40382	1	30954	2.69	2.52	94.39	2.03	1.55	12.07	25.43	11.42	10.45	30954	100	37856	82.2
18	Enfieldtown	CT	3	25990	1	45532	2.85	2.65	95.72	1.04	2.28	11.86	27.51	12.36	9.76	43944	96.51	44635	84.9
19	Glendalecity	CA	?	?	1	180038	2.62	1.3	74.02	14.14	20.96	12.04	26.68	12.37	11.54	180038	100	34372	76.1
20	Worthingtonc	OH	?	?	1	14869	2.67	2.28	94.74	2.67	0.74	13.71	20.33	9.48	12.38	14882	100	49851	81.8
21	Arlingtoncity	TX	?	?	1	261721	2.6	8.41	82.64	3.92	8.91	14.18	32.78	15.14	4.58	261763	100	35048	90.2
22	Plymouthcity	MN	53	51730	1	50889	2.77	1.61	95.66	2.04	1.02	13.13	26.94	12.19	4.77	50889	100	51314	92.2
23	NewYorkcity	NY	?	?	1	7322564	2.6	28.71	52.26	7	24.36	13.06	27.46	13.09	11.62	7322564	100	29823	73.5
24	Marinacity	CA	?	?	1	26436	3.34	18.97	53.6	20.84	10.73	16.16	37.22	19.09	4.13	26436	100	29043	90.3
25	Lebanoncity	NH	9	41300	1	12183	2.36	0.41	97.55	1.55	0.91	11.29	26.87	12.2	11.28	0	0	32221	84.6
26	Rockledgecity	FL	?	?	1	16023	2.63	13.79	83.94	1.42	2.4	11.91	23.09	10.33	13.65	16023	100	34934	80.4
27	Rogerscity	AR	?	?	1	24692	2.54	0.06	97.72	0.77	1.86	12.84	25.81	11.93	14.62	0	0	26198	73.9
28	Bellairecity	TX	?	?	1	13842	2.35	0.41	94.65	1.98	7.95	8.23	18.3	6.98	13.57	13842	100	45892	80.4
29	ElCajoncity	CA	?	?	1	88693	2.7	2.92	87.36	2.82	13.97	13.77	30.92	15.15	9.65	88693	100	28108	78.1
30	MosesLakecit	WA	?	?	1	11235	2.6	1.89	82.45	1.82	18.16	14.59	25.62	12.02	13.36	0	0	23258	72.4
31	WestMemphi	AR	?	?	1	28259	2.86	42.15	56.94	0.52	0.5	16.26	28.79	13.83	9.53	28259	100	22052	77.2
32	Eunicecity	LA	?	?	1	11162	2.8	26.96	72.26	0.4	0.78	15.43	26.03	12.04	12.78	0	0	14874	62.8
33	Laredocity	TX	?	?	1	122899	3.84	0.12	70.83	0.38	93.87	19.93	33.12	16.79	7.32	122899	100	18395	79.1
34	Amsterdamci	NY	57	2066	1	20714	2.36	1.46	93.15	0.56	11.61	11.35	23.13	11.19	21.15	0	0	22166	6
35	Gorhamtown	ME	5	28240	1	11856	3.03	0.37	98.84	0.4	0.45	20.11	31.45	19.01	8.63	3929	33.1	36618	83.2
36	RockSpringsc	WY	?	?	1	19050	2.67	1.17	94.31	0.96	7.46	15.43	26.48	11.73	8.64	0	0	34372	83.5
37	Oakdalecity	CA	?	?	1	11961	2.71	0.24	88.57	1.11	17.04	13.37	26.84	13.03	12.98	0	0	27230	73.4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3	Marpletownsl	PA	45	47616	1	23123	2.82	0.8	95.57	3.44	0.85	11.01	21.3	10.48	17.18	23123	100	47917	78.9
4	Tigardcity	OR	?	?	1	29344	2.43	0.74	94.33	3.43	2.35	11.36	25.88	11.01	10.28	29344	100	35669	8
5	Gloversvillecit	NY	35	29443	1	16656	2.4	1.7	97.35	0.5	0.7	12.55	25.2	12.19	17.57	0	0	20580	68.1
6	Bemidjicity	MN	7	5068	1	11245	2.76	0.53	89.16	1.17	0.52	24.46	40.53	28.69	12.65	0	0	17390	69.3
7	Springfieldcit	MO	?	?	1	140494	2.45	2.51	95.65	0.9	0.95	18.09	32.89	20.04	13.26	140494	100	21577	75.7
8	Norwoodtow	MA	21	50250	1	28700	2.6	1.6	96.57	1.47	1.1	11.17	27.41	12.76	14.42	28700	100	42805	79.4
9	Andersoncity	IN	?	?	1	59459	2.45	14.2	84.87	0.4	0.63	15.31	27.93	14.78	14.6	59449	100	23221	71
10	Fargocity	ND	17	25700	1	74111	2.46	0.35	97.11	1.25	0.73	16.64	35.16	20.33	8.58	74115	100	25326	83.6
11	Wacocity	TX	?	?	1	103590	2.62	23.14	67.6	0.92	16.35	19.88	34.55	21.62	13.12	103590	100	17852	74.
12	Shermancity	TX	?	?	1	31601	2.54	12.63	83.22	0.77	4.39	15.73	28.57	15.16	14.26	31596	100	24763	73.9
13	SanPablocity	CA	?	?	1	25158	2.89	21.34	49.42	17.21	26.78	13.65	28.82	13.23	9.44	25158	100	25479	73.4
14	BowlingGreer	KY	?	?	1	40641	2.54	12.18	86.39	1.12	0.68	21.51	36.83	23.96	11.5	0	0	20043	75.2
15	PineBluffcity	AR	?	?	1	57140	2.74	53.52	45.65	0.49	0.43	16.51	28.17	14.68	13.38	57140	100	19143	69.3
16	NewUlmcity	MN	15	46042	1	13132	2.53	0.06	99.21	0.47	0.59	14	25.03	12.83	14.57	0	0	25797	73.9
17	Maplewoodci	MN	123	40382	1	30954	2.69	2.52	94.39	2.03	1.55	12.07	25.43	11.42	10.45	30954	100	37856	82.2
18	Enfieldtown	CT	3	25990	1	45532	2.85	2.65	95.72	1.04	2.28	11.86	27.51	12.36	9.76	43944	96.51	44635	84.9
19	Glendalecity	CA	?	?	1	180038	2.62	1.3	[illegible]	[illegible]	[illegible]	20.96	[illegible]	[illegible]	11.54	180038	100	34372	76.1
20	Worthingtonc	OH	?	?	1	[illegible]	2.28	[illegible]	[illegible]	[illegible]	0.74	[illegible]	[illegible]	9.48	12.38	14882	100	49851	81.8
21	Arlingtoncity	TX	?	?	1	261721	2.6	8.41	82.64	3.92	8.91	14.16	32.78	15.14	4.58	261763	100	35048	90.2
22	Plymouthcity	MN	53	51730	1	50889	2.77	1.61	95.66	2.04	1.02	13.13	26.94	12.19	4.77	50889	100	51314	92.2
23	NewYorkcity	NY	?	?	1	7322564	2.6	28.71	52.26	7	24.36	13.06	27.46	13.09	11.62	7322564	100	29823	73.5
24	Marinacity	CA	?	?	1	26436	3.34	18.97	53.6	20.84	10.73	16.16	37.22	19.09	4.13	26436	100	29043	90.3
25	Lebanoncity	NH	9	41300	1	12183	2.36	0.41	97.55	1.55	0.91	11.29	26.87	12.2	11.28	0	0	32221	84.6
26	Rockledgecity	FL	?	?	1	16023	2.63	13.79	83.94	1.42	2.4	11.91	23.09	10.33	13.65	16023	100	34934	80.4
27	Rogerscity	AR	?	?	1	24692	2.54	0.06	97.72	0.77	1.86	12.84	25.81	11.93	14.62	0	0	26198	73.9
28	Bellairecity	TX	?	?	1	13842	2.35	0.41	94.65	1.98	7.95	8.23	18.3	6.98	13.57	13842	100	45892	80.4
29	ElCajoncity	CA	?	?	1	88693	2.7	2.92	87.36	2.82	13.97	13.77	30.92	15.15	9.65	88693	100	28108	78.1
30	MosesLakecit	WA	?	?	1	11235	2.6	1.89	82.45	1.82	18.16	14.59	25.62	12.02	13.36	0	0	23258	72.4
31	WestMemphi	AR	?	?	1	28259	2.86	42.15	56.94	0.52	0.5	16.26	28.79	13.83	9.53	28259	100	22052	77.2
32	Eunicecity	LA	?	?	1	11162	2.8	26.96	72.26	0.4	0.78	15.43	26.03	12.04	12.78	0	0	14874	62.8
33	Laredocity	TX	?	?	1	122899	3.84	0.12	70.83	0.38	93.87	19.93	33.12	16.79	7.32	122899	100	18395	79.1
34	Amsterdamci	NY	57	2066	1	20714	2.36	1.46	93.15	0.56	11.61	11.35	23.13	11.19	21.15	0	0	22166	6
35	Gorhamtown	ME	5	28240	1	11856	3.03	0.37	98.84	0.4	0.45	20.11	31.45	19.01	8.63	3929	33.1	36618	83.2
36	RockSpringsc	WY	?	?	1	19050	2.67	1.17	94.31	0.96	7.46	15.43	26.48	11.73	8.64	0	0	34372	83.5
37	Oakdalecity	CA	?	?	1	11961	2.71	0.24	88.57	1.11	17.04	13.27	26.84	13.02	12.98	0	0	27230	72.4

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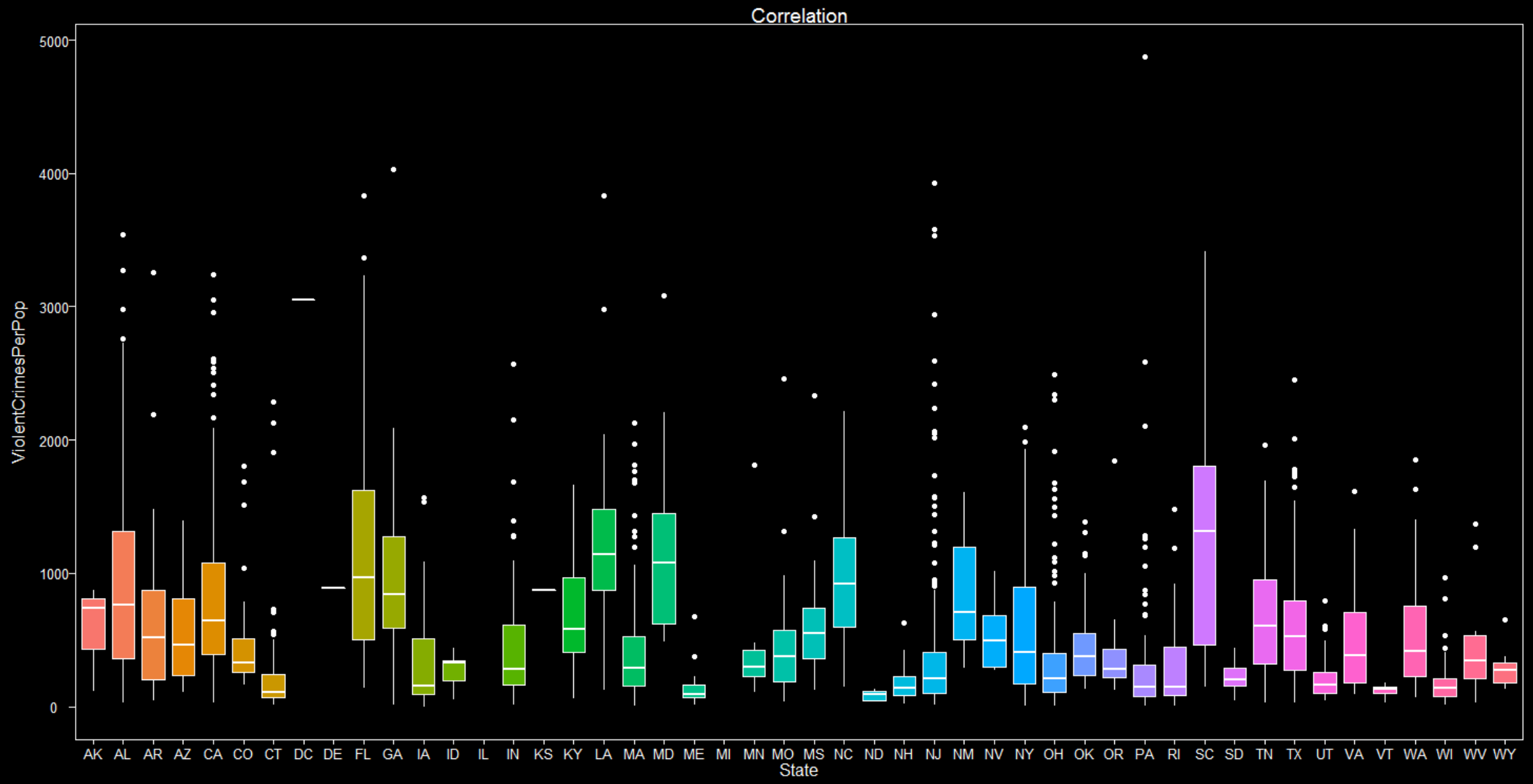

Correlation
ViolentCrimesPerPop
5000
4000
3000
2000
1000
0
AK AL AR AZ CA CO CT DC DE FL GA IA ID IL IN KS KY LA MA MD ME MI MN MO MS NC ND NH NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY
State

communityname	state	countyCode	communityCo	fold
BerkeleyHeightstown	NJ	39	5320	1
Marpletownship	PA	45	47616	1
Tigardcity	OR	?	?	1
Gloversvillecity	NY	35	29443	1
Bemidjicity	MN	7	5068	1
Springfieldcity	MO	?	?	1
Norwoodtown	MA	21	50250	1
Andersoncity	IN	?	?	1
Fargocity	ND	17	25700	1
Wacocity	TX	?	?	1
Shermancity	TX	?	?	1
SanPablocity	CA	?	?	1
BowlingGreencity	KY	?	?	1
PineBluffcity	AR	?	?	1
NewUlmcity	MN	15	46042	1
Maplewoodcity	MN	123	40382	1
Enfieldtown	CT	3	25990	1
Glendalecity	CA	?	?	1
Worthingtoncity	OH	?	?	1
Arlingtoncity	TX	?	?	1
Plymouthcity	MN	53	51730	1

팩터화

state	countyCode	communityCo
NJ	39	5320
PA	45	47616
OR	?	?
NY	35	29443
MN	7	5068
MO	?	?
MA	21	50250
IN	?	?
ND	17	25700
TX	?	?
TX	?	?
CA	?	?
KY	?	?
AR	?	?
MN	15	46042
MN	123	40382
CT	3	25990
CA	?	?
OH	?	?
TX	?	?
MN	53	51730

```
sum(train == '?')
train[train=='?'] <- NA
```

Numeric화

```
for(i in 3:dim(train)[2]){
  if(is.character(train[[i]])){
    train[[i]] <- as.numeric(train[[i]])
  }
}
```

1 – 2

“0”

"0. 짭이냐 찐이냐"

AB
blackPerCap
13600
18137
16644
9984
887
7382
10412
6016
5688
0
13140
8297
17693

(예시)

EB
rapes
0
1
6
10
?
77
4
34
35
141
29
21
36
59

2

CLEANSING

2

REMOVE

1

코드 변수 삭제

(‘countyCode’ , ‘communityCode’)

A	B	C	D
communit	state	countyCoc	communit
BerkeleyH	NJ	39	5320
Marpletow	PA	45	47616
Tigardcity	OR	?	?
Gloversvill	NY	35	29443
Bemidjicity	MN	7	5068
Springfielc	MO	?	?
Norwoodt	MA	21	50250
Andersonc	IN	?	?
Fargocity	ND	17	25700
Wacocity	TX	?	?
Shermanci	TX	?	?
SanPabloc	CA	?	?
BowlingGr	KY	?	?
PineBluffci	AR	?	?
NewUlmci	MN	15	46042
Maplewoc	MN	123	40382
Enfieldtow	CT	3	25990
Glendaleci	CA	?	?
Worthingt	OH	?	?
Arlingtonc	TX	?	?
Plymouthc	MN	53	51730

A	B	C	D
communit	state	countyCoc	communit
BerkeleyH	NJ	39	5320
Marpletow	PA	45	47616
Tigardcity	OR	?	?
Gloversvill	NY	35	29443
Bemidjicity	MN	7	5068
Springfielc	MO	?	?
Norwoodt	MA	21	50250
Andersonc	IN	?	?
Fargocity	ND	17	25700
Wacocity	TX	?	?
Shermanci	TX	?	?
SanPabloc	CA	?	?
BowlingGr	KY	?	?
PineBluffci	AR	?	?
NewUlmci	MN	15	46042
Maplewoc	MN	123	40382
Enfieldtow	CT	3	25990
Glendaleci	CA	?	?
Worthingt	OH	?	?
Arlingtonc	TX	?	?
Plymouthc	MN	53	51730
NewYorkci	NY	?	?

정보 중복 변수 삭제

예시)

ED	EE
robberies	robbbPerP
1	8.2
5	21.26
56	154.95
10	57.86
4	32.04

‘robberies’ : 강도 수

‘robbbPerPop’ : 강도 수/인구 수

정보 중복 변수 삭제

예시)

ED	EE
robberies	robbbPerP
1	8.2
5	21.26
56	154.95
10	57.86
4	32.04

'robberies' : 강도 수

'robbbPerPop' : 강도 수/인구 수

정보 중복 변수 삭제

rapes	rapesPerP	robberies	robbbPerP	assaults	assaultPerP	burglaries	burglPerPc	larcenies	larcPerPop	autoTheft	autoTheftP	arsons	arsonsPerP
0	0	1	8.2	4	32.81	14	114.85	138	1132.08	16	131.26	2	16.41
1	4.25	5	21.26	24	102.05	57	242.37	376	1598.78	26	110.55	1	4.25
6	16.6	56	154.95	14	38.74	274	758.14	1797	4972.19	136	376.3	22	60.87
10	57.86	10	57.86	33	190.93	225	1301.78	716	4142.56	47	271.93	?	?
?	?	4	32.04	14	112.14	91	728.93	1060	8490.87	91	728.93	5	40.05
77	50.98	136	90.05	449	297.29	2094	1386.46	7690	5091.64	454	300.6	134	88.72
4	13.53	9	30.44	54	182.66	110	372.09	288	974.19	144	487.1	17	57.5
34	55.79	98	160.8	128	210.02	608	997.6	2250	3691.79	125	205.1	9	14.77
35	43.87	16	20.05	41	51.39	425	532.66	3149	3946.71	206	258.18	8	10.03
141	130.69	453	419.89	1043	966.77	2397	2221.81	6121	5673.63	1070	991.8	18	16.68
29	90.25	71	220.96	131	407.69	468	1456.49	1817	5654.8	151	469.94	6	18.67
21	77.73	309	1143.81	362	1340	478	1769.39	1460	5404.4	430	1591.71	20	74.03
36	78.53	58	126.52	269	586.8	582	1269.58	1786	3895.99	148	322.85	9	19.63
59	100.51	261	444.61	531	904.55	1754	2987.92	2010	3424.02	517	880.7	46	78.36
?	?	0	0	9	65.82	67	489.98	283	2069.62	21	153.58	1	7.31
?	?	27	79.7	37	109.22	226	667.12	1618	4776.1	159	469.34	7	20.66
0	0	23	50.46	17	37.29	282	618.62	906	1987.5	232	508.94	7	15.36
30	16.72	355	197.91	277	154.42	1596	889.74	4501	2509.23	1447	806.68	73	40.7
2	13.24	10	66.18	5	33.09	99	655.15	414	2739.73	18	119.12	4	26.47
146	49.94	710	242.88	1396	477.55	3977	1360.48	11514	3938.78	2452	838.8	97	33.18

정보 중복 변수 삭제

rapes	rapesPerP	robberies	robbbPerP	assaults	assaultPerP	burglaries	burglPerPo	larcenies	larcPerPop	autoTheft	autoTheftP	arsons	arsonsPerP
0	0	1	8.2	4	32.81	14	114.85	138	1132.08	16	131.26	2	16.41
1	4.25	5	21.26	24	102.05	57	242.37	376	1598.78	26	110.55	1	4.25
6	16.6	56	154.95	14	38.74	274	758.14	1797	4972.19	136	376.3	22	60.87
10	57.86	10	57.86	33	190.93	225	1301.78	716	4142.56	47	271.93	?	?
?	?	4	32.04	14	112.14	91	728.93	1060	8490.87	91	728.93	5	40.05
77	50.98	136	90.05	449	297.29	2094	1386.46	7690	5091.64	454	300.6	134	88.72
4	13.53	9	30.44	54	182.66	110	372.09	288	974.19	144	487.1	17	57.5
34	55.79	98	160.8	128	210.02	608	997.6	2250	3691.79	125	205.1	9	14.77
35	43.87	16	20.05	41	51.39	425	532.66	3149	3946.71	206	258.18	8	10.03
141	130.69	453	419.89	1043	966.77	2397	2221.81	6121	5673.63	1070	991.8	18	16.68
29	90.25	71	220.96	131	407.69	468	1456.49	1817	5654.8	151	469.94	6	18.67
21	77.73	309	1143.81	362	1340	478	1769.39	1460	5404.4	430	1591.71	20	74.03
36	78.53	58	126.52	269	586.8	582	1269.58	1786	3895.99	148	322.85	9	19.63
59	100.51	261	444.61	531	904.55	1754	2987.92	2010	3424.02	517	880.7	46	78.36
?	?	0	0	9	65.82	67	489.98	283	2069.62	21	153.58	1	7.31
?	?	27	79.7	37	109.22	226	667.12	1618	4776.1	159	469.34	7	20.66
0	0	23	50.46	17	37.29	282	618.62	906	1987.5	232	508.94	7	15.36
30	16.72	355	197.91	277	154.42	1596	889.74	4501	2509.23	1447	806.68	73	40.7
2	13.24	10	66.18	5	33.09	99	655.15	414	2739.73	18	119.12	4	26.47
146	49.94	710	242.88	1396	477.55	3977	1360.48	11514	3938.78	2452	838.8	97	33.18

2

NA 확인

2

```
> result.naomit
                variables         mean   median        max      min  NAs
27             OtherPerCap     9442.765     8186     137000        0    1
100          LemasSwornFT      499.198      173      25655       65 1872
101       LemasSwFTPerPop      246.491   196.01    3437.23     29.4 1872
102     LemasSwFTFieldOps       432.56      152      22496       14 1872
103 LemasSwFTFieldPerPop      210.845   170.27    3290.62    19.21 1872
104         LemasTotalReq   252404.988    90000    8328470     2100 1872
105     LemasTotReqPerPop   120651.719  91034.6  1926281.5   2704.8 1872
106      PolicReqPerOffic      523.658    443.2     2162.5     20.8 1872
107           PolicPerPop      246.494      196     3437.2     29.4 1872
108    RacialMatchCommPol         85.5    87.93        100    42.15 1872
109         PctPolicWhite       82.516    86.18        100      1.6 1872
110         PctPolicBlack        9.263        5      67.31        0 1872
111          PctPolicHisp         5.46     2.04       98.4        0 1872
112         PctPolicAsian        0.681        0      18.57        0 1872
113         PctPolicMinor       15.242    11.37       98.4        0 1872
114   OfficAssgnDrugUnits       26.289       12       1773        0 1872
115     NumKindsDrugsSeiz        8.816        9         15        1 1872
116      PolicAveOTWorked      119.114     98.7      634.7        0 1872
120             PolicCars      185.478       86       3187       20 1872
121         PolicOperBudg 32176019.344 11164110 1617293056  2380215 1872
122  LemasPctPolicOnPatr       87.131    89.58      99.94    10.85 1872
123  LemasGangUnitDeploy        4.286        5         10        0 1872
125      PolicBudgPerPop   153577.871   114582    2422367 15260.4 1872
128               rapes       28.046        7       2818        0  208
129         rapesPerPop       36.258    26.92     401.35        0  208
130           robberies      237.952       19      86001        0    1
131         robbbPerPop      162.613     74.8    2264.13        0    1
132             assaults      326.528       56      62778        0   13
133        assaultPerPop      378.005  226.525     4932.5        0   13
134           burglaries      761.237      205      99207        2    3
135         burglPerPop      1033.43  822.715   11881.02    16.92    3
136           larcenies     2137.629      747     235132       10    3
137          larcPerPop     3372.979  3079.51   25910.55    77.86    3
138           autoTheft      516.693       75     112464        1    3
139      autoTheftPerPop      473.966  302.355    4968.59     6.55    3
140              arsons       30.908        5       5119        0   91
141         arsonsPerPop       32.154    21.08     436.37        0   91
142  ViolentCrimesPerPop      589.079   374.06    4877.06        0  221
143        nonViolPerPop     4908.242  4425.45   27119.76   116.79   97
```

데이터 수 2215 개 중 1872 개가 NA인 변수

(85%)

데이터 수 2215 개 중 91~221 개가 NA인 변수

(4%~10%)

```
> result.naomit
              variables         mean   median         max      min  NAs
27           OtherPerCap    9442.765     8186      137000        0    1
100         LemasSwornFT     499.198      173       25655       65 1872
101      LemasSwFTPerPop     246.491   196.01     3437.23     29.4 1872
102    LemasSwFTFieldOps      432.56      152       22496       14 1872
103 LemasSwFTFieldPerPop     210.845   170.27     3290.62    19.21 1872
104        LemasTotalReq  252404.988    90000     8328470     2100 1872
105    LemasTotReqPerPop  120651.719 91034.6  1926281.5   2704.8 1872
106     PolicReqPerOffic     523.658    443.2      2162.5     20.8 1872
107          PolicPerPop     246.494      196      3437.2     29.4 1872
108   RacialMatchCommPol        85.5    87.93         100    42.15 1872
109        PctPolicWhite      82.516    86.18         100      1.6 1872
110        PctPolicBlack       9.263        5       67.31        0 1872
111         PctPolicHisp        5.46     2.04        98.4        0 1872
112        PctPolicAsian       0.681        0       18.57        0 1872
113        PctPolicMinor      15.242    11.37        98.4        0 1872
114  OfficAssgnDrugUnits      26.289       12        1773        0 1872
115   NumKindsDrugsSeiz       8.816        9          15        1 1872
116    PolicAveOTWorked     119.114     98.7       634.7        0 1872
120           PolicCars     185.478       86        3187       20 1872
121       PolicOperBudg 32176019.344 11164110  1617293056  2380215 1872
122  LemasPctPolicOnPatr      87.131    89.58       99.94    10.85 1872
123  LemasGangUnitDeploy       4.286        5          10        0 1872
125     PolicBudgPerPop   153577.871   114582     2422367 15260.4 1872
128              rapes      28.046        7        2818        0  208
129         rapesPerPop      36.258    26.92      401.35        0  208
130           robberies     237.952       19       86001        0    1
131         robbbPerPop     162.613     74.8     2264.13        0    1
132            assaults     326.528       56       62778        0   13
133       assaultPerPop     378.005  226.525      4932.5        0   13
134          burglaries     761.237      205       99207        2    3
135         burglPerPop     1033.43  822.715    11881.02    16.92    3
136          larcenies    2137.629      747      235132       10    3
137          larcPerPop    3372.979  3079.51    25910.55    77.86    3
138          autoTheft     516.693       75      112464        1    3
139     autoTheftPerPop     473.966  302.355     4968.59     6.55    3
140             arsons      30.908        5        5119        0   91
141        arsonsPerPop      32.154    21.08      436.37        0   91
142  ViolentCrimesPerPop     589.079   374.06     4877.06        0  221
143       nonViolPerPop    4908.242  4425.45    27119.76   116.79   97
```

데이터 수 2215 개 중 1872 개가 NA인 변수

(85%)

->삭제!

데이터 수 2215 개 중 91~221 개가 NA인 변수

(4%~10%)

->임퓨테이션!

3

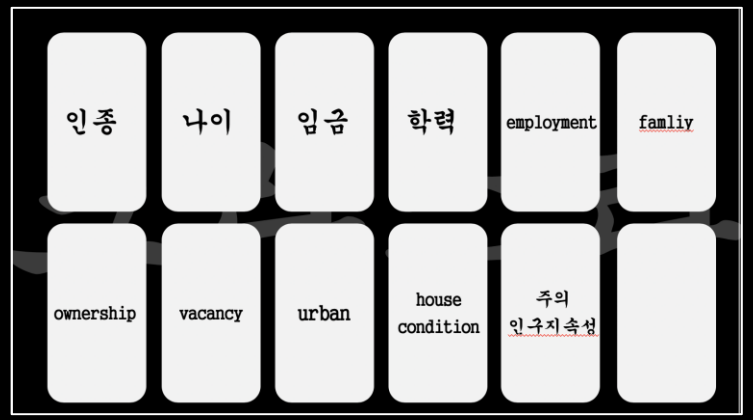
CLUSTERING

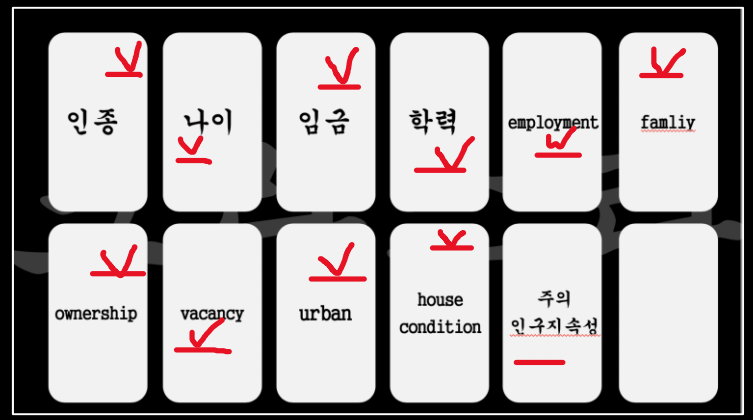
CLUSTERING

description.txt

```
-- communityname: Community name - not predictive - for information only (string)
-- state: US state (by 2 letter postal abbreviation)(nominal)
-- countyCode: numeric code for county - not predictive, and many missing values (numeric)
-- communityCode: numeric code for community - not predictive and many missing values
(numeric)
-- fold: fold number for non-random 10 fold cross validation, potentially useful for
debugging, paired tests - not predictive (numeric - integer)

-- population: population for community: (numeric - expected to be integer)
-- householdsize: mean people per household (numeric - decimal)
-- racepctblack: percentage of population that is african american (numeric - decimal)
-- racePctWhite: percentage of population that is caucasian (numeric - decimal)
-- racePctAsian: percentage of population that is of asian heritage (numeric - decimal)
-- racePctHisp: percentage of population that is of hispanic heritage (numeric - decimal)
-- agePct12t21: percentage of population that is 12-21 in age (numeric - decimal)
-- agePct12t29: percentage of population that is 12-29 in age (numeric - decimal)
-- agePct16t24: percentage of population that is 16-24 in age (numeric - decimal)
-- agePct65up: percentage of population that is 65 and over in age (numeric - decimal)
-- numbUrban: number of people living in areas classified as urban (numeric - expected to
be integer)
-- pctUrban: percentage of people living in areas classified as urban (numeric - decimal)
-- medIncome: median household income (numeric - may be integer)
-- pctWWage: percentage of households with wage or salary income in 1989 (numeric -
decimal)
-- pctWFarmSelf: percentage of households with farm or self employment income in 1989
(numeric - decimal)
-- pctWInvInc: percentage of households with investment / rent income in 1989 (numeric -
decimal)
-- pctWSocSec: percentage of households with social security income in 1989 (numeric -
decimal)
```





변수 디스트립션 → 군집화 → 대표 변수 선택

(주의) 한계점이 있읍니다.

인종	나이	임금	학력	employment	famliy
ownership	vacancy	urban	house condition	주의 인구지속성	

racepctblack
racePctWhite
racePctAsian
racePctHisp

agePct12t21
agePct12t29
agePct16t24
agePct65up

medIncome
pctWWage
pctWFarmSelf
pctWInvInc
pctWSocSec
pctWPubAss
…

PctLess9thGrad
PctNotHSGrad
PctBSorMore

PctUnemployed
PctEmploy
PctEmplManu
PctEmplProfServ
PctOccupManu
…

PctFam2Par
PctKids2Par
PctYoungKids2Par
PctTeen2Par
PctWorkMom
…

OwnOccMedVal
OwnOccHiQuart
OwnOccQrange
RentLowQ
RentMedian
RentHighQ

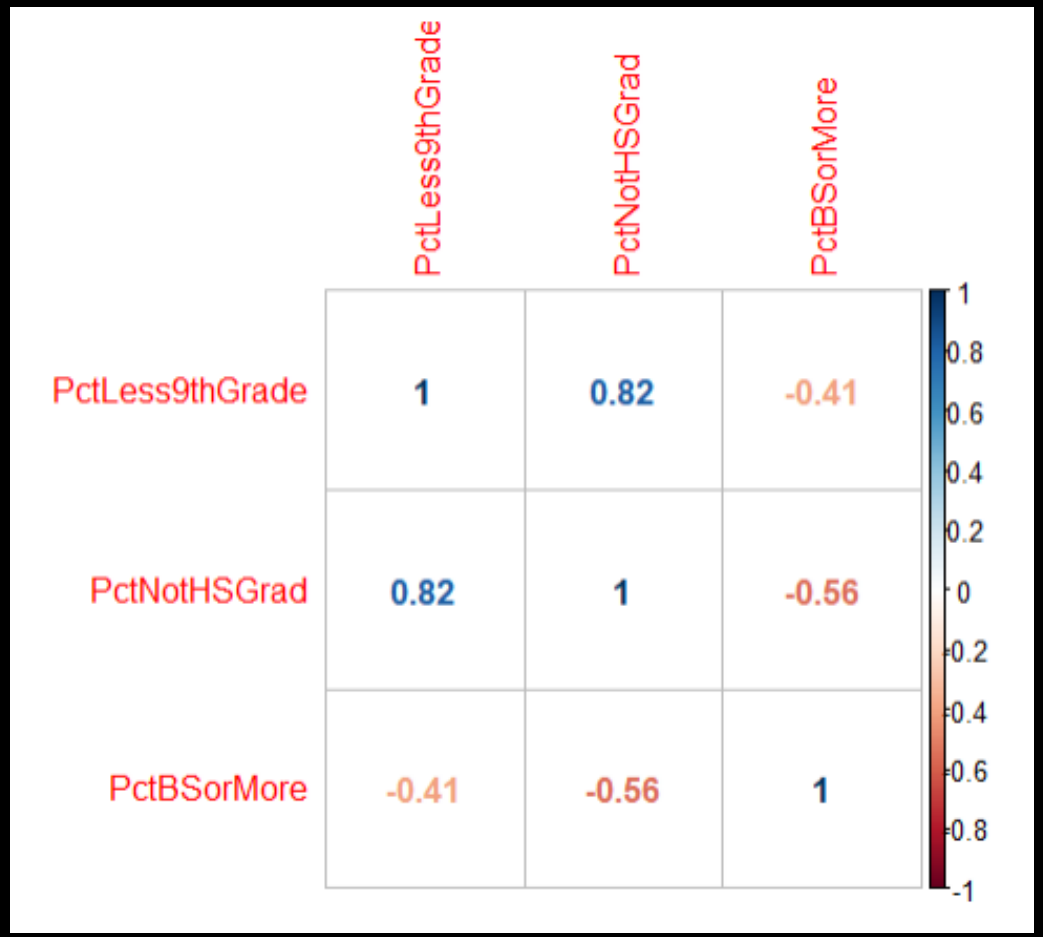
HousVacant
PctHousOccup
PctHousOwnOcc
PctVacantBoarded
PctVacMore
6Mos

pctUrban
NumStreet
NumInShelters

PctHousLess3BR
PctPersDenseHous
MedYrHousBuilt
PctHousNoPhone
PctW
OFullPlumb

PctForeignBorn
PctBorn-
SameState
PctSameHouse85
PctSameState85

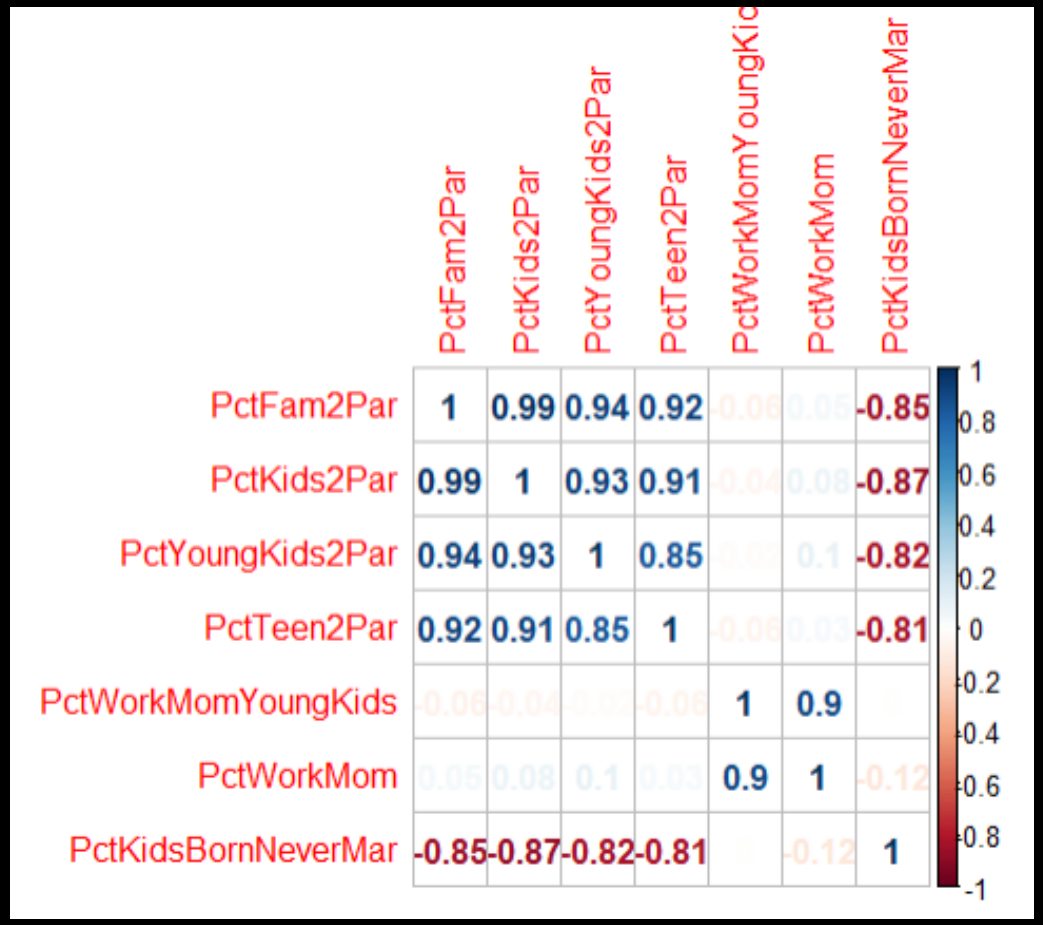
학력



EDA 경위서

변수
: 'racepctblack' ,' racePctWhite' , 'racePctAsian' , 'racePctHisp'

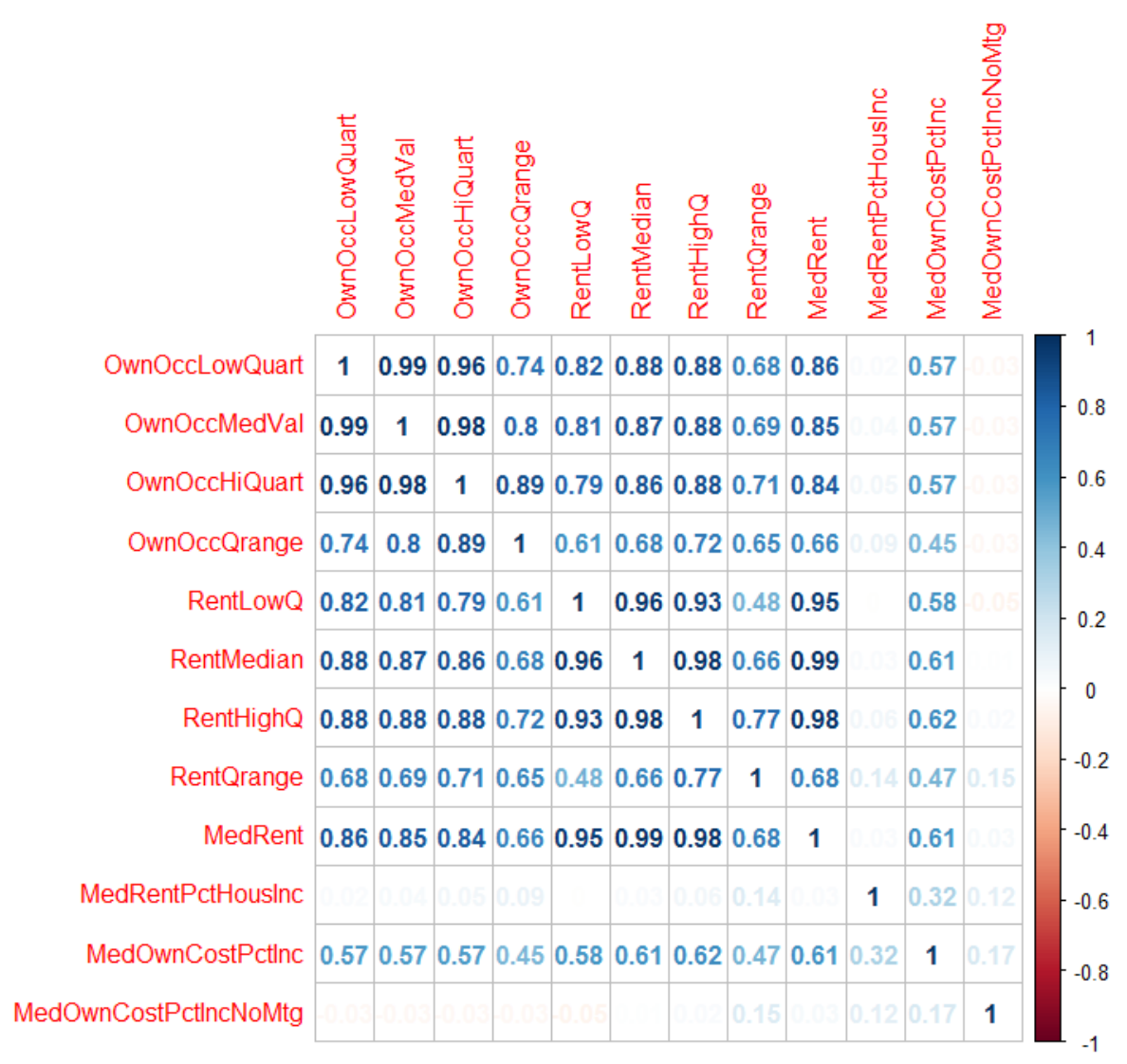
family



EDA 경위서

변수
: 'PctFam2Par', 'PctKids2Par', 'PctYoungKids2Par', 'PctTeen2Par', 'PctWorkingMomYoungKids', 'PctWorkMom', 'PctKidsBornNeverMar'

ownership



변수
: 'OwnOccLowQuart', 'OwnOccMedVal', 'OwnOccHiQuart', 'OwnOccQrange', 'RentLowQ', 'RentMedian', 'RentHighQ', 'RentQrange', 'MedRent', 'MedRentPctHousInc', 'MedOwnCostPctInc', 'MedOwnCostPctIncNoMtg'

4

TRANSFORMATION

변수 변환 대상

” Skewed”

'pop','pctBlack','pctAsian','pctHisp','medIncome','pctWfarm','pctPubAsst','blackPerCap','NAperCap',

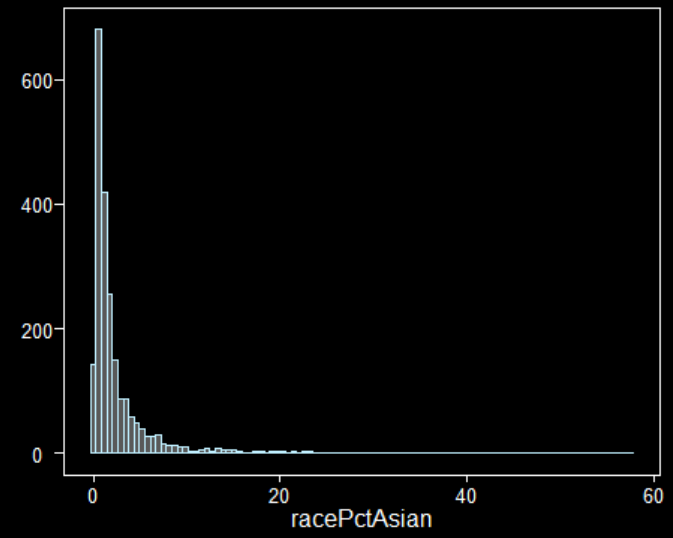
'asianPerCap','otherPerCap','hispPerCap','pctPoverty','pctLowEdu','pctKidsBornNevrMarr','numForeignBorn',

'pctFgnImmig.3','pctFgnImmig.3.5','pctFgnImmig.5.8','pctFgnImmig.8.10','pctImmig.10','pctNotSpeakEng',

'pctLargHousFam','pctPopDenseHous','houseVacant','pctVacantBoarded','pctHousWOphone','pctHousWOplumb',

'ownHousMed','rentMed','medGrossRent','medOwnCostPctWO','persEmergShelt','pctForeignBorn','landArea',

'popDensity','pctUsePubTrans','pctOfficDrugUnit','nonviolentPerPop'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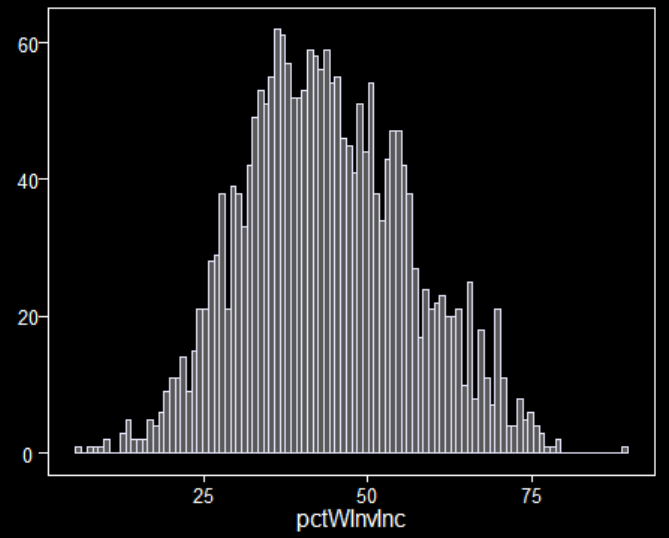
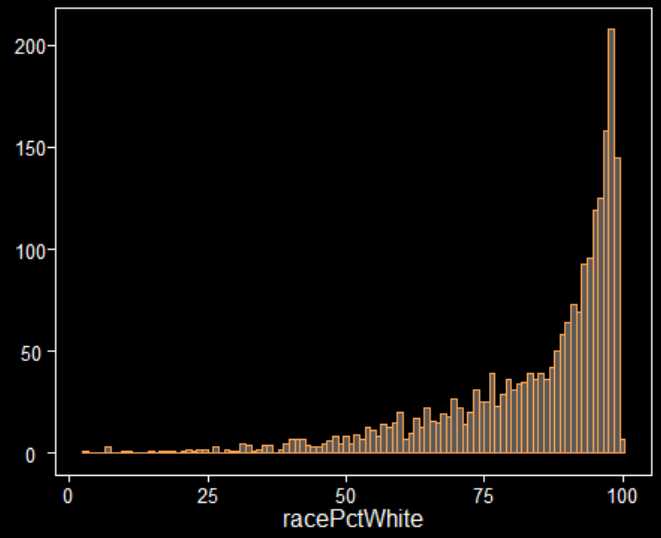
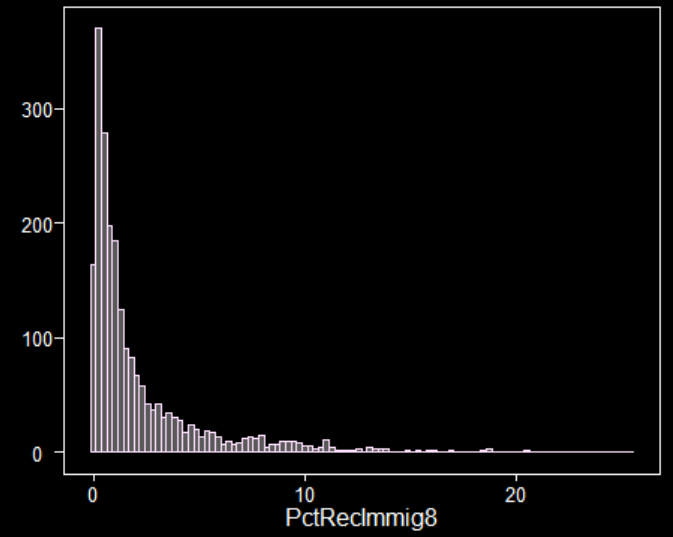
400
200
0
0
20
40
60
racePctAsian


60
40
20
0
25
50
75
pctWInvInc


200
150
100
50
0
0
25
50
75
100
racePctWhite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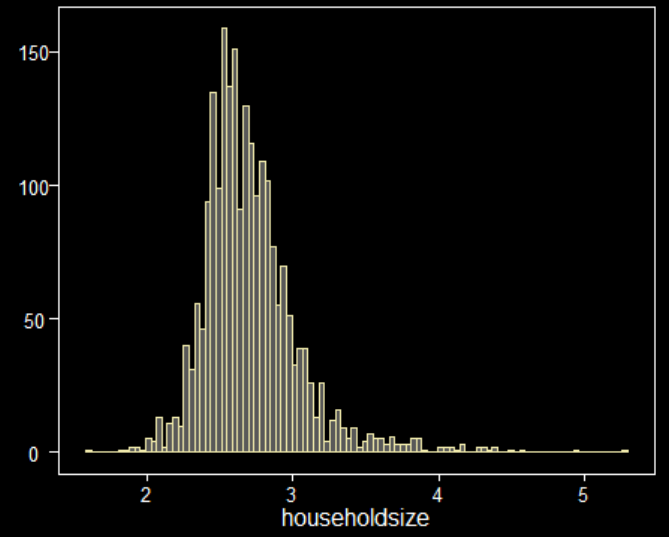
0
10
20
PctRecImmig8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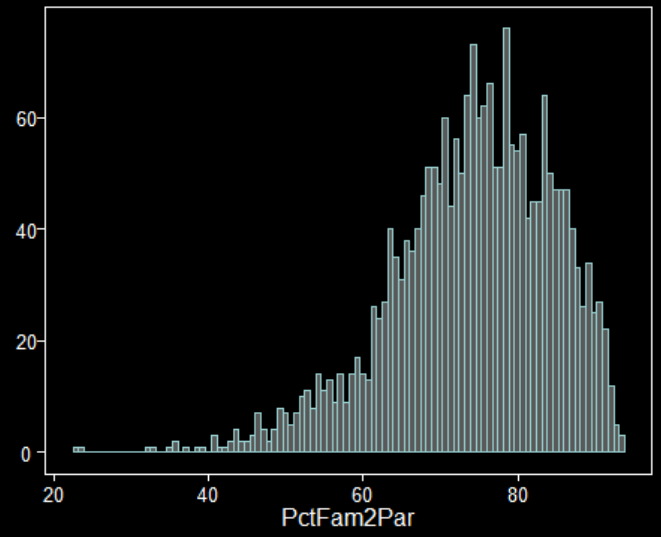
50
0
2
3
4
5
householdsize


60
40
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40
60
80
PctFam2Par

E O D