

R Notebook

PCA in Action

```
#download.file("https://raw.githubusercontent.com/mauriciogtec/PropedeuticoDataScience2017/master/Datos/DatosINEGI.csv", "inegi.csv")
inegi = read.csv("inegi.csv")
```

Para determinar las variables per cápita para poder análisis son Secundarias, DefuncionesGenerales, Nacimientos, Divorcios y Matrimonios.

```
for(variable in c("Secundarias", "DefuncionesGenerales", "Nacimientos", "Divorcios", "Matrimonios")) {
  inegi[, variable] = inegi[, variable] / inegi["Poblacion"]
}
View(inegi)
```

Es importante limpiar los datos... guardando en una matriz x las variables numéricas a analizar (menos Estado y Población), y vamos a guardar como row.names.

```
x = inegi[, -(1:2)]
print(x)
```

##	PIBpc	Secundarias	IndiceAprovechamientoSecundaria	
## 1	84.70	0.0002936719	85.3	
## 2	83.07	0.0001885854	86.0	
## 3	94.64	0.0002448880	87.9	
## 4	395.55	0.0003866539	78.5	
## 5	106.05	0.0002012086	75.9	
## 6	76.49	0.0002597782	81.8	
## 7	34.44	0.0004125856	89.9	
## 8	85.10	0.0002266279	80.1	
## 9	172.88	0.0001588507	85.9	
## 10	67.61	0.0005683022	80.6	
## 11	65.67	0.0003082183	89.2	
## 12	41.28	0.0005178873	86.7	
## 13	53.06	0.0004472765	90.8	
## 14	81.43	0.0002607921	91.8	
## 15	54.41	0.0002386685	83.5	
## 16	52.80	0.0003668091	76.3	
## 17	58.21	0.0002655823	84.1	
## 18	55.16	0.0005170607	89.9	
## 19	151.81	0.0002073727	82.8	
## 20	36.25	0.0005818049	88.8	
## 21	53.81	0.0003749246	87.2	
## 22	95.07	0.0002691559	79.1	
## 23	103.91	0.0002866674	85.2	
## 24	63.29	0.0006331420	85.1	
## 25	66.45	0.0003226435	89.7	
## 26	84.46	0.0002569033	87.0	
## 27	107.34	0.0003314567	82.1	
## 28	93.88	0.0002276236	80.7	
## 29	41.15	0.0003034354	80.4	
## 30	52.71	0.0004188040	82.7	
## 31	63.79	0.0003047694	79.0	
## 32	48.17	0.0007728079	85.1	
##	PorcentajeAnalfabetas	DefuncionesGenerales	Nacimientos	Divorcios
## 1	3.26	0.004444741	0.02272835	0.0011957846
## 2	2.57	0.004676917	0.01992697	0.0010440339
## 3	3.21	0.004299668	0.02019384	0.0011679272
## 4	8.31	0.004819799	0.02230312	0.0013836859
## 5	2.63	0.005530509	0.02181858	0.0013345990
## 6	5.13	0.005713583	0.02063161	0.0010114441
## 7	17.80	0.004672287	0.03010958	0.0004419816
## 8	3.66	0.006513204	0.02047137	0.0018209493
## 9	2.09	0.006326347	0.01735732	0.0012546492
## 10	3.82	0.005440514	0.02466052	0.0009877925
## 11	8.18	0.005004035	0.02231201	0.0008759887
## 12	16.68	0.005352093	0.02900317	0.0004966407
## 13	10.23	0.004970323	0.02248540	0.0007189445
## 14	4.36	0.005517175	0.02193225	0.0005826670
## 15	4.38	0.004744442	0.02150863	0.0008493751
## 16	10.18	0.005587174	0.02410575	0.0008241713
## 17	6.42	0.005805111	0.02106990	0.0007826800
## 18	6.31	0.005275678	0.02371567	0.0009954110
## 19	2.20	0.005149934	0.02029459	0.0016196557

## 20	16.27	0.005661551	0.02511992	0.0002056833
## 21	10.38	0.005509333	0.02548449	0.0005003608
## 22	6.31	0.004592609	0.02273984	0.0008878862
## 23	4.77	0.003514693	0.02167809	0.0007747564
## 24	7.91	0.005167630	0.02159993	0.0006841956
## 25	4.97	0.005182528	0.02079045	0.0013588601
## 26	3.04	0.005634221	0.02019471	0.0011335296
## 27	7.06	0.004839625	0.02180199	0.0008107735
## 28	3.61	0.005462966	0.01935504	0.0007205021
## 29	5.19	0.004837017	0.02410645	0.0003863459
## 30	11.44	0.006225800	0.02147976	0.0006024968
## 31	9.23	0.005601416	0.01862724	0.0012661225
## 32	5.55	0.005644449	0.02389868	0.0012088540

##	Matrimonios	PorcentajePartosHospitales	PorcentajeAguaPotable
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## 1	0.005240524	97.1	98.0
## 2	0.005557721	65.7	93.3
## 3	0.004483333	95.2	86.7
## 4	0.006404107	87.0	89.5
## 5	0.005597457	90.3	97.9
## 6	0.005207861	98.5	97.9
## 7	0.005014823	33.2	74.5
## 8	0.005497781	78.0	93.9
## 9	0.004014877	94.8	97.8
## 10	0.005924306	81.3	93.0
## 11	0.005706868	85.5	93.5
## 12	0.006667615	60.7	70.6
## 13	0.003805978	78.4	88.9
## 14	0.005322907	88.5	93.0
## 15	0.004775017	91.1	92.4
## 16	0.006167036	85.6	90.7
## 17	0.004430498	86.9	91.6
## 18	0.005633289	82.0	93.1
## 19	0.005789673	96.4	95.5
## 20	0.005502948	59.7	76.7
## 21	0.003637997	80.0	85.3
## 22	0.005061991	94.2	93.1
## 23	0.006925281	89.9	92.8
## 24	0.005202826	86.9	84.9
## 25	0.006173943	94.1	94.4
## 26	0.005447928	95.4	95.3
## 27	0.004957109	80.4	76.9
## 28	0.005582897	96.5	96.4
## 29	0.004914799	93.6	98.2
## 30	0.005410827	75.3	76.8
## 31	0.006115842	89.9	96.0
## 32	0.006415245	91.4	94.1

##	PorcentajeAguaEntubada	PorcentajeElectricidad	PorcentajeParedesSolidas
## 1	98.9	99.2	92.3
## 2	95.9	98.5	77.0
## 3	92.4	96.7	90.3
## 4	90.3	96.8	80.7
## 5	98.2	99.1	84.8
## 6	98.5	99.0	94.7
## 7	78.1	95.9	67.4

## 8	95.2	96.3	77.2
## 9	97.8	99.5	97.9
## 10	94.7	96.1	66.7
## 11	94.7	98.2	93.2
## 12	71.3	95.3	63.0
## 13	91.2	96.9	91.3
## 14	96.0	99.0	91.9
## 15	94.4	98.9	93.9
## 16	92.1	98.0	80.3
## 17	91.8	98.8	90.6
## 18	93.0	96.9	90.0
## 19	96.2	98.3	94.0
## 20	77.2	94.3	66.4
## 21	88.1	97.7	87.3
## 22	95.0	97.7	96.6
## 23	92.2	96.2	87.2
## 24	86.4	95.6	80.9
## 25	94.9	98.4	94.7
## 26	96.5	97.9	88.2
## 27	82.2	98.4	87.5
## 28	95.5	97.0	85.5
## 29	98.2	98.5	90.3
## 30	81.1	96.6	81.5
## 31	97.0	97.4	93.2
## 32	94.4	98.3	63.4

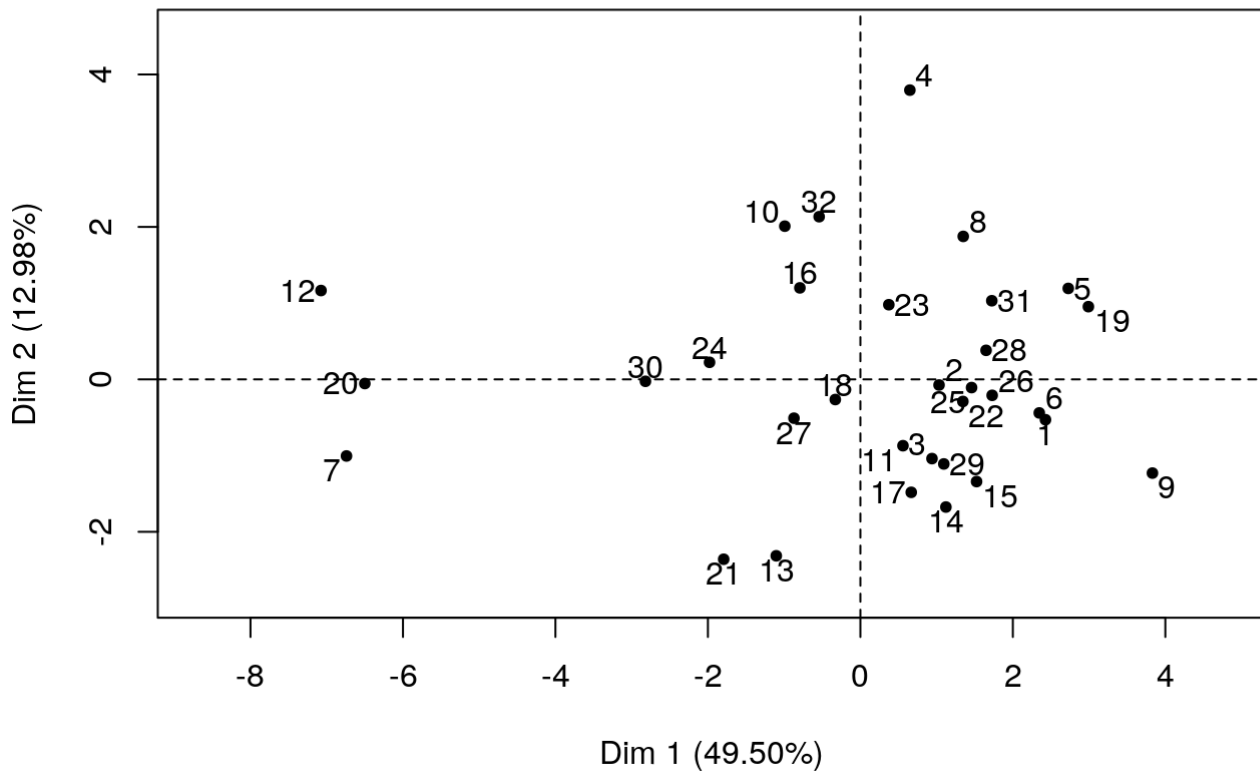
PorcentajePisoTierra

## 1	1.7
## 2	3.3
## 3	5.8
## 4	4.7
## 5	1.6
## 6	4.5
## 7	14.7
## 8	3.2
## 9	1.0
## 10	6.3
## 11	4.1
## 12	18.4
## 13	7.1
## 14	3.0
## 15	3.8
## 16	10.3
## 17	7.2
## 18	4.0
## 19	2.0
## 20	18.7
## 21	9.5
## 22	3.7
## 23	3.7
## 24	8.7
## 25	6.1
## 26	5.3
## 27	6.4
## 28	3.3

```
## 29          3.9
## 30        11.7
## 31         2.8
## 32         3.4
```

```
library(FactoMineR)
model = PCA(x)
```

Individuals factor map (PCA)



Variables factor map (PCA)

