Bayesian

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Script para calcular probabilidades condicionadas de frecuencia dada la precipitación a nivel de AGEB.

1. Importar datos

```
Bayesiano <-read.csv
("C:\\Users\\Usuario\\Documents\\Inundaciones\\Precipitacion_Inundacion\\
Datos_Bayesiano\\Datos0714.csv", header=T)
str(Bayesiano)
```

```
## 'data.frame':    2052 obs. of  6 variables:
##  $ Rel_AGEB_Colonia_csv_AGEB_ID : int  5959 5960 5961 5962 5963 5964
5966 5967 5968 5969 ...
##  $ Rel_AGEB_Colonia_csv_OBJECTID: int  11394 11394 11394 11394 11394
11394 11416 11416 11433 11409 ...
##  $ MuniColo                     : Factor w/ 957 levels "ALVARO
OBREGON_2DA AMPL PRESIDENTES",..: 115 115 115 115 115 115 138 138 111 147
...
##  $ Frecuencia                   : int  70 70 70 70 70 70 14 14 1 10
...
##  $ Volumen                      : num  107 107 107 107 107 ...
##  $ Precipitacion                : num  682 679 687 683 690 ...
```

2. Obtener percentiles

```
quantile(Bayesiano$Precipitacion, c(.25, .50, .75))
```

```
##      25%      50%      75%
## 571.8471 638.8309 725.4617
```

```
range(Bayesiano$Precipitacion)
```

```
## [1]  472.1979 1145.3333
```

```
quantile(Bayesiano$Frecuencia, c(.25, .50, .75))
```

```
## 25% 50% 75%
##   5  17  50
```

```
quantile(Bayesiano$Volumen,  c(.25, .50, .75))
```

```
##      25%      50%      75%
##  6.66250 21.47209 69.70946
```

3. Crear categorías

```
Bayesiano$FrecCateg<-ifelse(Bayesiano$Frecuencia<5,
"1",ifelse(Bayesiano$Frecuencia>4.99 &
Bayesiano$Frecuencia<21.4,"2",ifelse(Bayesiano$Frecuencia>21.39 &
Bayesiano$Frecuencia<69.7, "3", "4")))
Bayesiano$PrecCateg<-ifelse(Bayesiano$Precipitacion<571.8,
"1",ifelse(Bayesiano$Precipitacion>571.79
&Bayesiano$Precipitacion<638.8,"2",ifelse(Bayesiano$Precipitacion>638.79
& Bayesiano$Precipitacion<725.4, "3", "4")))
Bayesiano$VolCateg<-ifelse(Bayesiano$Volumen< 6.6,
"1",ifelse(Bayesiano$Volumen>
6.59&Bayesiano$Volumen<21.4,"2",ifelse(Bayesiano$Volumen>21.39 &
Bayesiano$Volumen<69.70, "3", "4")))

head(Bayesiano)
```

```
##   Rel_AGEB_Colonia_csv_AGEB_ID Rel_AGEB_Colonia_csv_OBJECTID
## 1                         5959                         11394
## 2                         5960                         11394
## 3                         5961                         11394
## 4                         5962                         11394
## 5                         5963                         11394
## 6                         5964                         11394
##                          MuniColo Frecuencia  Volumen Precipitacion
## 1 AZCAPOTZALCO_INFONAVIT EL ROSARIO         70 107.0416      682.2857
## 2 AZCAPOTZALCO_INFONAVIT EL ROSARIO         70 107.0416      678.8375
## 3 AZCAPOTZALCO_INFONAVIT EL ROSARIO         70 107.0416      687.4464
## 4 AZCAPOTZALCO_INFONAVIT EL ROSARIO         70 107.0416      682.7292
## 5 AZCAPOTZALCO_INFONAVIT EL ROSARIO         70 107.0416      690.0500
## 6 AZCAPOTZALCO_INFONAVIT EL ROSARIO         70 107.0416      686.9625
##   FrecCateg PrecCateg VolCateg
## 1         4         3        4
## 2         4         3        4
## 3         4         3        4
## 4         4         3        4
## 5         4         3        4
## 6         4         3        4
```

4. Obtener el número de AGEBS en cada categoría

```
TablaPrecFrec <- xtabs(~FrecCateg+PrecCateg, data=Bayesiano)
TablaPrecVolu <- xtabs(~VolCateg+PrecCateg, data=Bayesiano)
```

5. Obtener probabilidades condicionadas

```
probF1<- TablaPrecFrec[,1]/sum(TablaPrecFrec[,1])
probF2<- TablaPrecFrec[,2]/sum(TablaPrecFrec[,2])
probF3<- TablaPrecFrec[,3]/sum(TablaPrecFrec[,3])
probF4<- TablaPrecFrec[,4]/sum(TablaPrecFrec[,4])

probV1<- TablaPrecVolu[,1]/sum(TablaPrecVolu[,1])
probV2<- TablaPrecVolu[,2]/sum(TablaPrecVolu[,2])
```

```
probV3<- TablaPrecVolu[,3]/sum(TablaPrecVolu[,3])
probV4<- TablaPrecVolu[,4]/sum(TablaPrecVolu[,4])
```

6. Asignar probabilidades a las AGEBS

```
Bayesiano$ProbaFP<-ifelse(Bayesiano$FrecCateg== "1"&
Bayesiano$PrecCateg=="1",probF1[1], ifelse(Bayesiano$FrecCateg== "2"&
Bayesiano$PrecCateg=="1",probF1[2],ifelse(Bayesiano$FrecCateg== "3"&
Bayesiano$PrecCateg=="1",probF1[3],ifelse(Bayesiano$FrecCateg== "4"&
Bayesiano$PrecCateg=="1",probF1[4], ifelse(Bayesiano$FrecCateg== "1"&
Bayesiano$PrecCateg=="2",probF2[1],ifelse(Bayesiano$FrecCateg== "2"&
Bayesiano$PrecCateg=="2",probF2[2],ifelse(Bayesiano$FrecCateg== "3"&
Bayesiano$PrecCateg=="2",probF2[3],ifelse(Bayesiano$FrecCateg== "4"&
Bayesiano$PrecCateg=="2",probF2[4],ifelse(Bayesiano$FrecCateg== "1"&
Bayesiano$PrecCateg=="3",probF3[1], ifelse(Bayesiano$FrecCateg== "2"&
Bayesiano$PrecCateg=="3",probF3[2],ifelse(Bayesiano$FrecCateg== "3"&
Bayesiano$PrecCateg=="3",probF3[3],ifelse(Bayesiano$FrecCateg== "4"&
Bayesiano$PrecCateg=="3",probF3[4],ifelse(Bayesiano$FrecCateg== "1"&
Bayesiano$PrecCateg=="4",probF4[1],ifelse(Bayesiano$FrecCateg== "2"&
Bayesiano$PrecCateg=="4",probF4[2],ifelse(Bayesiano$FrecCateg== "3"&
Bayesiano$PrecCateg=="4",probF4[3],probF4[4])))))))))))))))

Bayesiano$ProbaVP<-ifelse(Bayesiano$VolCateg== "1"&
Bayesiano$PrecCateg=="1",probV1[1], ifelse(Bayesiano$VolCateg== "2"&
Bayesiano$PrecCateg=="1",probV1[2],ifelse(Bayesiano$VolCateg== "3"&
Bayesiano$PrecCateg=="1",probV1[3],ifelse(Bayesiano$VolCateg== "4"&
Bayesiano$PrecCateg=="1",probV1[4], ifelse(Bayesiano$VolCateg== "1"&
Bayesiano$PrecCateg=="2",probV2[1],ifelse(Bayesiano$VolCateg== "2"&
Bayesiano$PrecCateg=="2",probV2[2],ifelse(Bayesiano$VolCateg== "3"&
Bayesiano$PrecCateg=="2",probV2[3],ifelse(Bayesiano$VolCateg== "4"&
Bayesiano$PrecCateg=="2",probV2[4],ifelse(Bayesiano$VolCateg== "1"&
Bayesiano$PrecCateg=="3",probV3[1], ifelse(Bayesiano$VolCateg== "2"&
Bayesiano$PrecCateg=="3",probV3[2],ifelse(Bayesiano$VolCateg== "3"&
Bayesiano$PrecCateg=="3",probV3[3],ifelse(Bayesiano$VolCateg== "4"&
Bayesiano$PrecCateg=="3",probV3[4],ifelse(Bayesiano$VolCateg== "1"&
Bayesiano$PrecCateg=="4",probV4[1],ifelse(Bayesiano$VolCateg== "2"&
Bayesiano$PrecCateg=="4",probV4[2],ifelse(Bayesiano$VolCateg== "3"&
Bayesiano$PrecCateg=="4",probV4[3],probV4[4])))))))))))))))
```

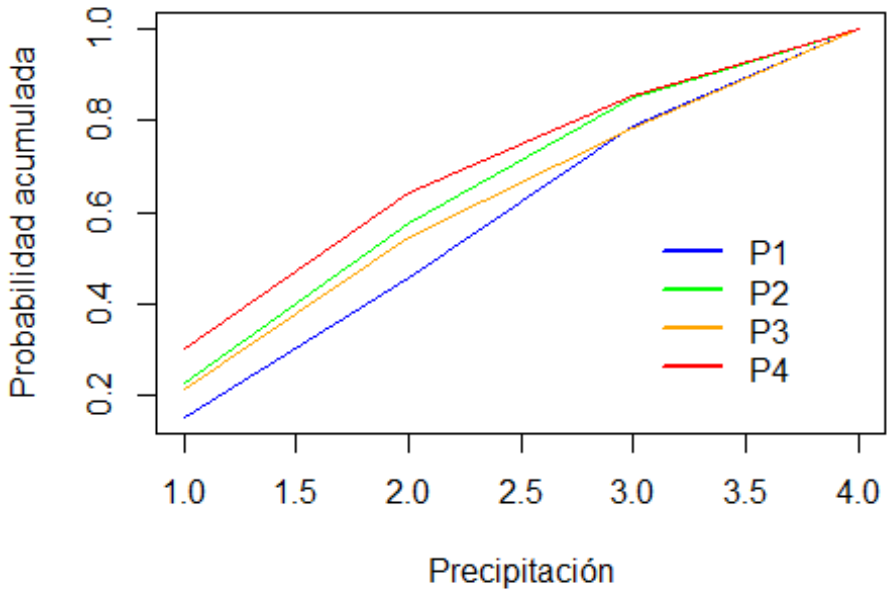
7. Probabilidades acumuladas para cada categoría de precipitació

```
####Sacar probabilidades acumuladas
cummulativeP1 <- c(probF1[1],
probF1[1]+probF1[2],probF1[1]+probF1[2]+probF1[3],probF1[1]+probF1[2]+pro
bF1[3]+probF1[4])
cummulativeP2 <- c(probF2[1],
probF2[1]+probF2[2],probF2[1]+probF2[2]+probF2[3],probF2[1]+probF2[2]+pro
bF2[3]+probF2[4])
cummulativeP3 <- c(probF3[1],
probF3[1]+probF3[2],probF3[1]+probF3[2]+probF3[3],probF3[1]+probF3[2]+pro
bF3[3]+probF3[4])
cummulativeP4 <- c(probF4[1],
```

```
probF4[1]+probF4[2],probF4[1]+probF4[2]+probF4[3],probF4[1]+probF4[2]+pro
bF4[3]+probF4[4])
```

8. Graficar probabilidades acumuladas

```
plot(cummulativeP1,type="l", col="blue", ylab= "Probabilidad acumulada",
xlab="Precipitación")
lines(cummulativeP2,type="l", col="green")
lines(cummulativeP3,type="l", col="orange")
lines(cummulativeP4,type="l", col="red")
legend(3,0.6, c("P1","P2","P3","P4"), horiz=F,bty="n",
lty=1,lwd=2,col=c("blue","green","orange","red"))
```



9. Salvar resultados

```
write.csv(Bayesiano,
file="C:\\Users\\Usuario\\Documents\\Inundaciones\\Precipitacion_Inundaci
on\\ProbabilidadesbayesianAGEB0714.csv")
```