Estudio de la temperatura en la vivienda

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Introducción:

Se tiene como datos el conjunto de mediciones de temperatura en una vivienda unifamiliar.Las mediciones se realizaron entre los meses de Enero a Mayo del 2016 cada 10 minutos. El número total de ambientes medidos son 10, de los cuales dos de ellos corresponden a la zona exterior del inmueble (llamados *"Out Builiding"* y *"North Out Building"*).

Para un estudio preliminar se realizaron:

1.Gráfico de la temperatura temporal y espacial respecto a los ambientes.

2.Análisis de Dispersión,Histograma y Correlacción entre cada ambiente.

3.Gráfico de la temperatura diaria promedio por cada mes.

A continuación se muestran los pasos desarrollados mediante ***R Markdown***:

Descarga de paquetes:

```
#Para realizar filtros en los datos:
library (dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.3.1
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
#Para realizar gráficos más elegantes:
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.3.3
```

```
#Para realizar análisis de correlaciones:
library(psych)
```

```
## Warning: package 'psych' was built under R version 3.3.3
```

```
##
## Attaching package: 'psych'

## The following objects are masked from 'package:ggplot2':
##
##     %+%, alpha

#Para descargar más fondos de letras:
library(extrafont)

## Warning: package 'extrafont' was built under R version 3.3.3

## Registering fonts with R
```

Extracción de datos:

```
setwd("~/Analisis de Datos/Practicas en R/Estudio temperatura en
vivienda")
datos <- read.csv("energydata_complete.csv", header=TRUE, sep=",", quote=
"\"'" , stringsAsFactors= FALSE, dec=".")
columnas <- c("datetime")
for (i in 1:9){ letra <- paste("T",i, sep="")
                        columnas <- c(columnas, letra) }
columnas <- c(columnas, "T_out")
cuadro <- as.character(datos$date)
for(i in seq(4,22,2)){cuadro <- cbind(cuadro,round(datos[,i], digits =
2))}
colnames(cuadro) <- columnas
cuadro <- as.data.frame(cuadro)
for (i in 2:11) { cuadro[,i] <- as.numeric(as.character(cuadro[,i]))}
cuadro$date <- format(strptime (cuadro$datetime, "%Y-%m-%d
%H:%M:%S"),"%H:%M:%S")
cuadro$dia <- format(strptime (cuadro$datetime, "%Y-%m-%d %H:%M:%S"),
"%Y-%m-%d")
cuadro$Ndia <- as.numeric(as.Date(cuadro$dia, format= "%Y-%m-%d"))
cuadro$month <- as.numeric(format(strptime (cuadro$datetime, "%Y-%m-%d
%H:%M:%S"), "%m"))
```

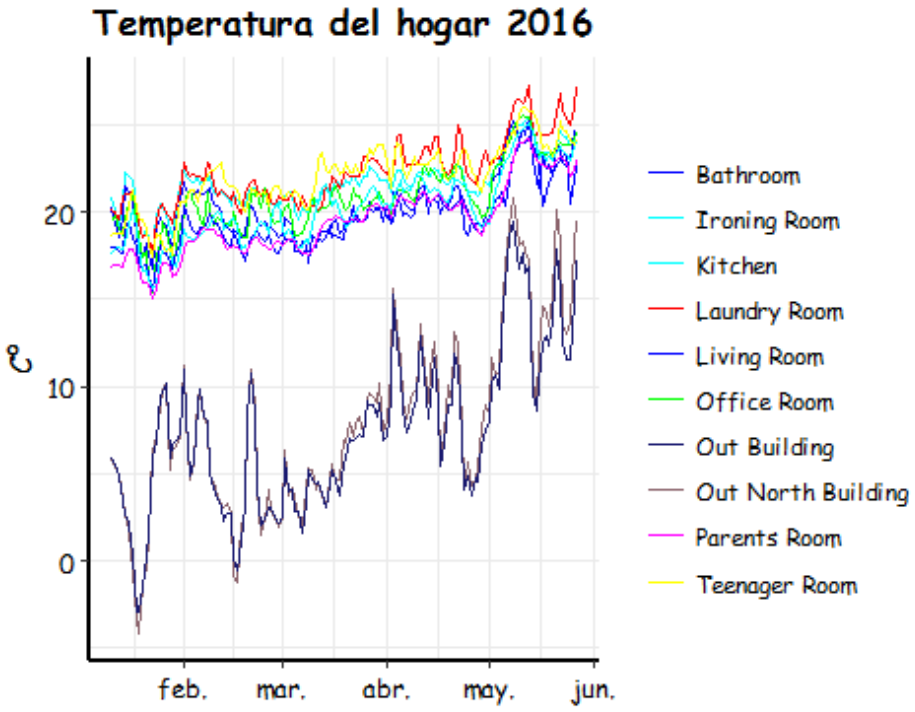
Creación de una lista de tiempo diario cada 10 minutos:

```
tiempo <- list()
i <- 1
for (h in 0:23){ if (h < 10 ){
                              H <- paste("0",h,sep="")
                              H <- paste(H,":",sep="")}
                else { H <- paste(h,":",sep="")}
               for ( m in 0:5) {  if( m == 0){
                                     t <- paste(H,"00:00",sep="")}
                                  else { t <- paste(H,m*10,sep="")
                                         t <- paste(t,":00",sep="")
                                       }
                 tiempo[i] <- t
```

```
                  i <- i +1
                                }
                               }
tiempo <- as.character(tiempo)
```

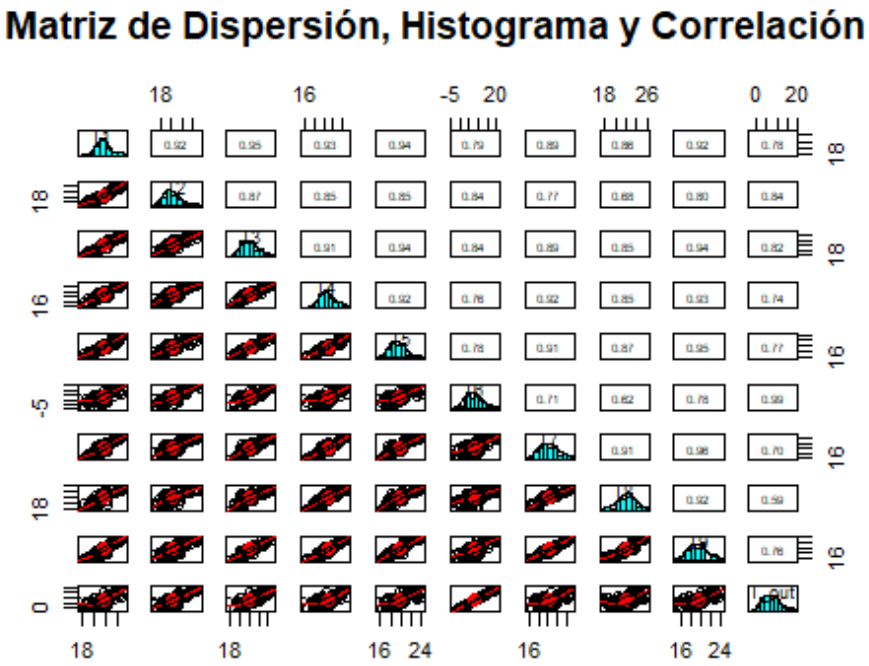
1.Temperatura espacial y temporal:

```
dias <- c(rep(0,max(cuadro$Ndia)-min(cuadro$Ndia)+1))
i <- 1
TDP <- matrix(rep(0,(max(cuadro$Ndia)-
min(cuadro$Ndia)+1)*10),max(cuadro$Ndia)-min(cuadro$Ndia)+1,10)
for (k in min(cuadro$Ndia): max(cuadro$Ndia)){
                       filtro <- filter(cuadro, Ndia == k)
                      TDP[i,] <- round(colMeans(filtro[,2:11]),digits= 1)
                      dias[i] <- filtro$dia[1]
                            i <- i +1
                                              }
TDP <- cbind(dias,TDP)
TDP <- data.frame(TDP)
colnames(TDP)[-1] <- columnas[-1]
TDP$dias <- as.Date(TDP$dias, format= "%Y-%m-%d")
for (i in 2:11) { TDP[,i] <- as.numeric(as.character(TDP[,i]))}
p <- ggplot(TDP,aes(dias)) + theme_bw()
p <- p + geom_line(aes(y= T1,colour= "Kitchen"))
p <- p + geom_line(aes (y= T2,colour= "Living Room"))
p <- p + geom_line(aes (y= T3,colour= "Laundry Room"))
p <- p + geom_line(aes (y= T4,colour= "Office Room"))
p <- p + geom_line(aes (y= T5,colour= "Bathroom"))
p <- p + geom_line(aes (y= T6,colour= "Out North Building"))
p <- p + geom_line(aes (y= T7,colour= "Ironing Room"))
p <- p + geom_line(aes(y= T8,colour= "Teenager Room"))
p <- p + geom_line(aes (y= T9,colour= "Parents Room"))
p <- p + geom_line(aes(y= T_out,colour= "Out Building"))
p <- p + xlab("") + ylab("Cº") + ggtitle("Temperatura del hogar 2016")
p <- p + theme(plot.title= element_text(hjust= 0.5, family= "Comic Sans
MS", face="bold"), axis.line= element_line(size= 1,colour= "black"),
panel.border= element_blank())
p <- p + theme(text= element_text(family= "Comic Sans MS"),axis.text.x=
element_text(colour= "black",size= 10),axis.text.y= element_text(colour=
"black",size= 10))
p<- p + scale_colour_manual("",values= c("Kitchen" = 5, "Living Room" =
428, "Laundry Room" = "red", "Office Room" = "green", "Bathroom" = 68,
"Out North Building" = "pink4", "Ironing Room" = 381, "Teenager Room" =
535, "Parents Room" = 150,"Out Building" = "midnightblue"))
p
```



2.Matriz de Dispersión, Histograma y Correlación:

```
pairs.panels(TDP[,-1], pch=21,main="Matriz de Dispersión, Histograma y Correlación")
```



3.Temperatura diario promedio por mes:

```
TPD <- matrix( rep(0, length(tiempo)*5*12),length(tiempo)*5,12)
n <- 1
for( i in 1:5) { monthdata <- filter( cuadro, month == i)
for (k in  1: length(tiempo)) { datetimemonth <- filter(monthdata, date
== tiempo[k])
tempmedia <- round(colMeans(datetimemonth[,2:11]),digits = 1)
artificio <- paste("2016-01-11",tiempo[k])
TPD[n,] <- c(artificio,tempmedia,i)
n <- n +1
                                }
               }
colnames(TPD) <- c(columnas,"Mes")
TPD <- as.data.frame(TPD)
TPD$datetime <- strptime(TPD$datetime, format="%Y-%m-%d %H:%M:%S")
for(i in 2:11){ TPD[,i] <- as.numeric(as.character(TPD[,i]))}
meses <- list( '1'="January",'2'="February",'3'="March",'4'="April", '5'=
"May")
meses_labeller <- function(variable,value){ return(meses[value])}
#Plot usando ggplot2:
p <- ggplot(TPD,aes(datetime)) + theme_bw()
p <- p + geom_line(aes(y= T1,colour= "Kitchen"))
p <- p + geom_line(aes (y= T2,colour= "Living Room"))
p <- p + geom_line(aes (y= T3,colour= "Laundry Room"))
p <- p + geom_line(aes (y= T4,colour= "Office Room"))
p <- p + geom_line(aes (y= T5,colour= "Bathroom"))
p <- p + geom_line(aes (y= T6,colour= "Out North Building"))
p <- p + geom_line(aes (y= T7,colour= "Ironing Room"))
p <- p + geom_line(aes(y= T8,colour= "Teenager Room"))
p <- p + geom_line(aes (y= T9,colour= "Parents Room"))
p <- p + geom_line(aes(y= T_out,colour= "Out Building"))
p <- p + xlab("") + ylab("Cº")
p <- p + ggtitle("Temperatura promedio diario 2016")
p <- p + theme(plot.title= element_text(hjust= 0.5, family= "Comic Sans
MS", face="bold"), axis.line= element_line(size= 0.5,colour= "black"),
panel.border= element_blank())
p <- p + theme(text= element_text(family= "Comic Sans MS"),axis.text.x=
element_text(colour= "black",size= 10),axis.text.y= element_text(colour=
"black",size= 10))
p <- p + scale_colour_manual("",values= c("Kitchen" = 5, "Living Room" =
428, "Laundry Room" = "red", "Office Room" = "green", "Bathroom" = 68,
"Out North Building" = "pink4", "Ironing Room" = 381, "Teenager Room" =
535, "Parents Room" = 150,"Out Building" = "midnightblue"))
p <- p + facet_wrap(~ Mes,ncol=2, labeller = meses_labeller, scale=
"free_y")

## Warning: The labeller API has been updated. Labellers taking
`variable`and
## `value` arguments are now deprecated. See labellers documentation.
```

```
p <- p + scale_x_datetime(date_labels = "%H:%M")
p <- p + theme(axis.text.x= element_text(size= 6))
p <- p + theme(axis.text.y= element_text(size= 7))
p
```