# Case Study 1: Clustering the epileptic.qol Dataset

## Descriptive statistics

## Load Dataset

```r
# install.packages("joineRML")
library(joineRML)
# import data from joineRML library
# use ?epileptic.qol to see details such as variable names and labels
data(epileptic.qol)
# convert days to months
epileptic.qol$time_month <- epileptic.qol$time/30.25
# sort by id and time
epileptic.qol <- epileptic.qol[order(epileptic.qol$id,epileptic.qol$time_month),]
```

## Make Spaghetti Plots to Visualize the Trajectory Patterns

```r
# Individual Longitudinal Profiles for Three Features of Interest:
# (a) Anxiety Score (anxiety)
# (b) Depress Score (depress)
# (c) Liverpool Adverse Events Profile (aep)
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.2.2
```

```r
# randomly select 10 individuals for plotting;
# one can also plot all the individuals by skiping this step
set.seed(202302)
epileptic.qol.R <- epileptic.qol[epileptic.qol$id %in%
                                 sample(epileptic.qol$id,10,replace=FALSE),]
# trajectory plot for anxiety feature
p1 <- ggplot(data = epileptic.qol.R, aes(x = time_month, y = anxiety, group = id))+
        geom_point() +
        geom_line() +
        theme_bw() +
        theme(legend.position = "none",
           plot.title = element_text(size = 20, face = "bold"),
           axis.text=element_text(size=20),
           axis.title=element_text(size=20),
           axis.text.x = element_text(angle = 0 ),
           strip.text.x = element_text(size = 20, angle = 0),
           strip.text.y = element_text(size = 20,face="bold")) +
        xlab("Time (months)") + ylab("anxiety")
# trajectory plot for depress feature
p2 <- ggplot(data = epileptic.qol.R, aes(x = time_month, y = depress, group = id))+
        geom_point() +
```

```
        geom_line() +
        theme_bw() +
        theme(legend.position = "none",
            plot.title = element_text(size = 20, face = "bold"),
            axis.text=element_text(size=20),
            axis.title=element_text(size=20),
            axis.text.x = element_text(angle = 0 ),
            strip.text.x = element_text(size = 20, angle = 0),
            strip.text.y = element_text(size = 20,face="bold")) +
        xlab("Time (months)") + ylab("depress")
# trajectory plot for aep feature
p3 <- ggplot(data = epileptic.qol.R, aes(x = time_month, y = aep, group = id))+
        geom_point() +
        geom_line() +
        theme_bw() +
        theme(legend.position = "none",
            plot.title = element_text(size = 20, face = "bold"),
            axis.text=element_text(size=20),
            axis.title=element_text(size=20),
            axis.text.x = element_text(angle = 0 ),
            strip.text.x = element_text(size = 20, angle = 0),
            strip.text.y = element_text(size = 20,face="bold")) +
        xlab("Time (months)") + ylab("aep")
# install.packages("cowplot")
library(cowplot)
plot_grid(p1,NULL,p2,NULL,p3,NULL,
        labels=c("(A)","", "(B)","","(C)",""), nrow = 1,
        align = "v", rel_widths = c(1,0.1,1,0.1,1,0.1))
```

## Warning: Removed 1 rows containing missing values (`geom_point()`).

## Warning: Removed 1 row containing missing values (`geom_line()`).