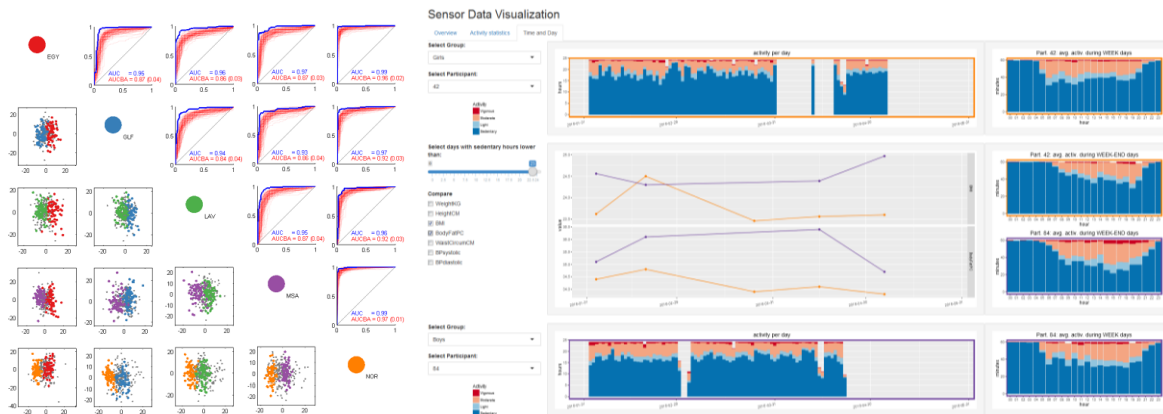


Visual Exploration and Clustering of Actigraphy Data to improve Sleep Efficiency

Project Description:

Sleep efficiency is a major cause of obesity and other bad health conditions we can observe in Qatar. Actigraphy data can be used to analyze the activity level of the patient through its body general movements. These data are now widely available from accelerometers embedded in wearable devices. We developed machine learning models able to detect sleep and awake stages and sleep quality from these data. However these models are black boxes that give decisions without explanations. Doctors need to understand the different activity patterns of their patients to give relevant guidelines to improve their sleep quality.

We develop new interactive visualization techniques to support the analysis of these actigraphy data and ease their understanding by detection and grouping of typical and outlying patterns. The technique we use is based on splitting and merging groups visualized through color-coded scatterplots representations arranged in a grid. We aim to improve and adapt this technique to the case of actigraphy data.



Objectives:

- Adapt the existing interface to the specific case of actigraphy data analysis
- Get users' feedback through a usability study to evaluate and improve the design

Required Skills: R-Shiny, Java, HTML, Javascript, D3.js

Learning Opportunities: The intern will acquire deeper knowledge of R-Shiny, D3, Data Visualization and skills to conduct user studies, and will work closely with the mentors to design and evaluate the tool. If successful, the project outcome will be reported in a research paper.

Expected team size: 1 intern

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