Intro to ML Student projects Ws 2022/23

## **Human Activity Recognition**

[Human Activity Recognition](https://en.wikipedia.org/wiki/Activity_recognition), or HAR for short, is the problem of predicting what a person is doing based on a trace of their movement using sensors.

It is a challenging problem because there is no clear analytical way to relate the sensor data to specific actions in a general way. It is technically challenging because of the large volume of sensor data collected (e.g. tens or hundreds of observations per second) and the classical use of hand-crafted features and heuristics from this data in developing predictive models.

**Project task:** Record different types of human activities with your smart phones and build a classification model to recognize the activities with a high accuracy.

**ToDos & Questions to be answered:**

* Define 4 activities you would like to classify. Use only two of the classical movements like: idle, walk, run, walking upstairs, walking downstairs. Choose two additional “creative” movements.
* Define where to position the sensor (smart phone) & the duration of each movement.
* Choose the amount of data (repetition of each movement) you need from each group member to build a robust model & start recording the data
* Explore & pre-process your data
* Select features for your ML model
* Find a good ML model to predict the different activity types
* Evaluate the model & interpret the results
* Implement a shiny app with your classification model
* Summarize your work and present it to the other students on Feb. 1, 2023. Presentation format (.pptx, LATEX, …) can be selected freely.
* Submit your shiny app and the presentation until 31.01.2023.

**Hint:** Have a look on the publication from [Thandassery & Beena from 2017](https://www.researchgate.net/publication/331590140_Human_Activity_Recognition_by_Smartphone_using_Machine_Learning_Algorithm_for_Remote_Monitoring) to see an example how to perform such a classification and things to consider.