Introduction

Oxygen uptake ($VO_2$) is usually a difficult variable to measure, and we would like to propose a shortcut to measure this variable using other biomarkers which are simpler to measure.

These biomarkers are individual’s Heart Rate ($HR$), Breathing Frequency ($BF$), Minute Ventilation ($VE$) and total Hip Acceleration ($ACCHIP$) measured using a smart T-shirt with a high resolution for several days.

We have over a million data points measured on 13 healthy individuals.

Design

The study subjects are male students who saw our announcement and volunteered to participate in our study. None of students are smokers, and they have agreed to wear the measurement tools during 3 ordinary days.

The study protocol has been approved by relevant ethics authorities.

Data presentation

Below you may see several scatterplots describing a portion of the data (0.2% randomly chosen):
We highly encourage you to include any graphics you may have produced in this description. They help us understand the study, which facilitates our collaborations greatly.

Apart from these biomarkers, we have also recorded the physical activity levels of individuals at each moment. Each individual has reported his age, weight and height at the beginning of the study.

We need to know all available variables, their nature and the way they are measured. Here for example we still don’t know if you have actually measured their weight or asked them about it!
Hypotheses

Our main goal to find a combination of $HR$, $BF$, $VE$ and $ACCHIP$ that can predict $VO_2$ with a high precision.

We would also like to assess the effect of physical activity level (a categoric variable) on the accuracy in predicting $VO_2$ by other variables.

We would like to see your study questions in order of importance in this section. Make sure that your study questions and hypotheses are clearly stated and please avoid any non-specific hypotheses (no fishing expeditions).

Previously performed analysis

We have not performed any statistical analysis yet, some graphical means have however been used to check the quality of measurements.

Any previous quality checks/corrections/analyses/plots are helpful for us. Our first meeting will be more fruitful if we know all you have already done in advance. We recommend using a PDF file (or more if necessary), and please do not send any raw data.