

# WELLNESS SENSING USING WEARABLE SENSORS

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## MOTIVATION

Activity recognition of every day activities can be used for a lot of different purposes, preventive medicine, promotion of health-enhancing physical activities and a healthier lifestyle. It has a high industrial interest and a high impact on society.

Wearable sensors are becoming less and less intrusive and more accurate. As well mobile devices are becoming increasingly sophisticated and smartphones with accelerometer and other sensors are widely popular nowadays.

## GOALS

The goal in this project is the development of a stable platform for data collection, labeling and post visualization method.

The main challenge is to get meaningful labelled data, so afterwards it can be analyzed by machine learning algorithms to detect certain activity types.

## METHOD

### ANDROID MOBILE APPLICATION

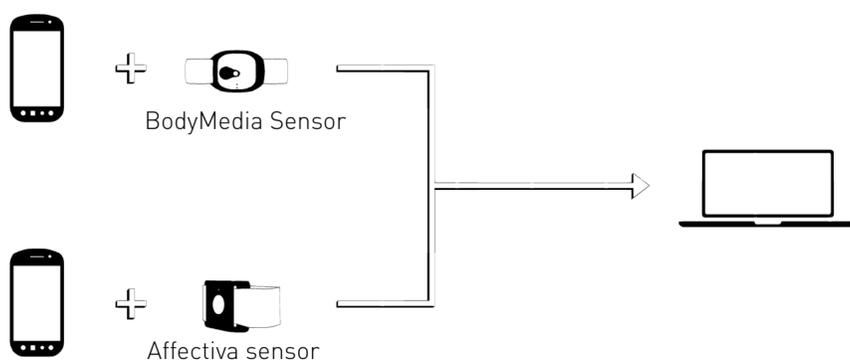
- Activity labelling.
- Accelerometer data collection.

### DATA COLLECTION

Data have been collected by the users while performing normal daily activities along 2-3 days.

Two different types of sensor + an Android phone.

Data Collection flow:



### MATLAB TOOL

- Data visualization and comparison.
- Activity Labelling.
- SAX method could be applied to preprocess the data.

## CONCLUSIONS

Data collection and labelling process is working.

Collected data can be visualized and analyzed with the Matlab tool developed.

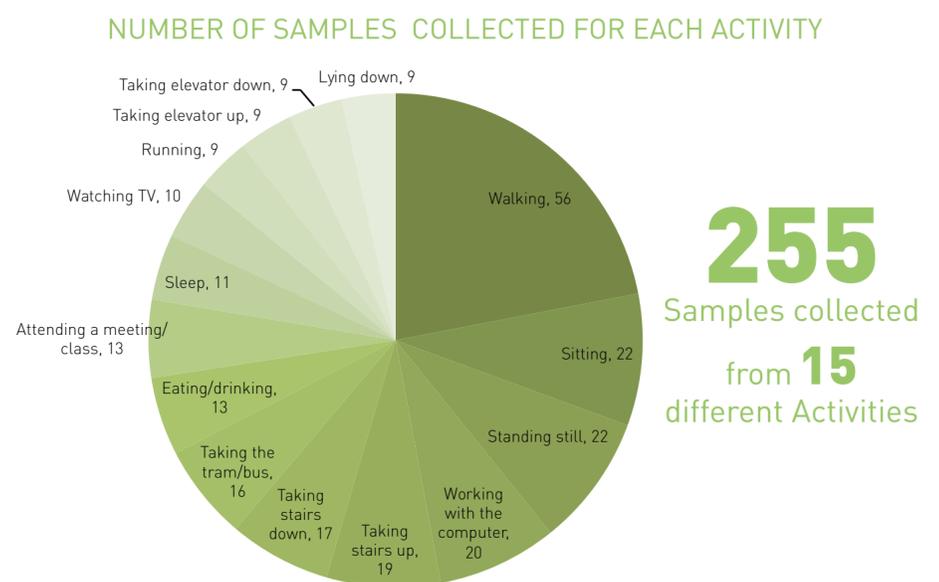
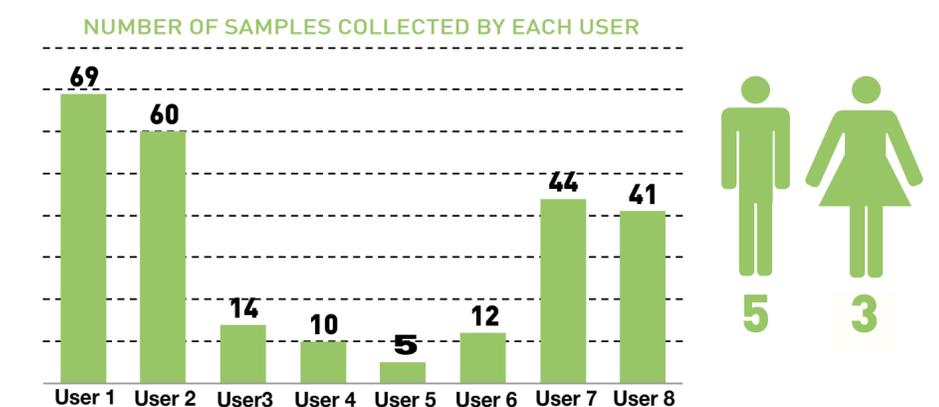
SAX representation is implemented and could be used for activity recognition later on.

## BASIC CONCEPTS

SAX method could be applied while processing the data. Afterwards, it can be analyzed by machine learning algorithms to detect certain activity types.

SAX is the first method for the symbolic representation of time series that allows dimensionality reduction and indexing with a lower-bounding distance measure. This symbolic approach allows a time series of length  $n$ , is reduced to a string length  $w$  ( $w < n$ ).

## RESULTS



SAX method applied (segments in color) to data from the sensor compared to the data collected from the mobile phone (visualization from the MATLAB tool developed). Time series of accelerometer data from the sensors(x axis against the time):

