Impact of study design on development and evaluation of an activity-type classifier

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Often methods developed to classify activities are laboratory based and may not reflect real-life situations. This paper examines how study design may impact on classifier performance in real life. Twenty eight subjects wore 9 triaxial GENEActiv accelerometers while performing 58 activities. For each sensor location, logic classifiers were trained in subsets of up to 8 activities to distinguish between walking and non-walking activities. This was then evaluated in all 58 activities. Different weighting factors were used to provide an estimation of the confusion matrix as would apply in a real-life scenario, in addition to a laboratory setting. The sensitivity of the classifier estimated with a traditional lab-based protocol was within the range of estimates derived from real-life scenarios for any body location. The specificity was over estimated by the laboratory scenario. Walking time was systematically over estimated, except by the lower back sensor.

In conclusion, classifiers developed under laboratory confined conditions may not accurately reflect classifier performance in real life. Further studies are required to evaluate activity classification methods, with respect to comparing experimental conditions to real-life conditions.

The complete abstract can be viewed or publication purchased by following the link:

http://jap.physiology.org/content/114/8/1042.long