# Machine learning identification of upper limb activity after stroke

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**Résumé**

After a stroke, use-dependent neuroplasticity is essential to recovery, particularly for upper limb function. To individualize the nature and dose of rehabilitation, therapists wish to monitor the nature and dose of upper limb activity over the long term, at home. Using wrist-worn accelerometers, the number of functional movements can be assessed, but identifying the nature of each activity remains a challenge.
Here, we use standard machine learning methods trained on simple statistical descriptors to predict the nature of each upper limb activity in a small benchmark dataset we recorded (two wrist-worn 3D accelerometers + timed tags). We found that random forest classification trees performed best (95% accuracy), dimensionality reduction with PCA was unnecessary, and features of the Euclidean norm distribution of acceleration were among the most useful descriptors. We conclude that standard machine learning methods are interesting in this context where very large reference datasets do not exist, which does not allow for more advanced machine learning.

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