

# Body Posture Recognition Based on the Raw Accelerometry Data

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**Abstract:** Applications of novel statistical and signal processing techniques to the raw accelerometry data enable reliable estimation of physical activity in a free-living environment. We present our work quantifying non-sedentary behavior based on the measurements from a tri-axial wrist-worn accelerometer. The key idea leverages the observation that hands are pointed down during standing and pointed mostly horizontally while sitting. In addition, standing activities often generate signal with large sub-second variation. Our algorithm, Sedentary and Upright Body Posture Classification (SedUp), utilizes data obtained from the axis representing the spatial position of a sensor. We estimate median and median standard deviation for the chosen axis in sliding time windows. The classification between sedentary and upright body posture is obtained using the logistic mixed regression models built using the extracted features. The method is applied to the data collected in a cohort of HIV-infected individuals who wore the devices for one week in a free-living environment. We summarize the associations between the health outcomes and extracted physical activity measures, such as amount of time standing per day.