Applying PSO to improve the pedestrian fall detection rate using wearable sensor data

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Abstract— **Pedestrian fall detection attracts a lot of research due to its importance in building a warning system to avoid negative consequences. There are many techniques for fall detection that have used different devices such as cameras, environmental sensors, wearable sensors, etc. However, the popularity of wearable devices with many embedded sensors has motivated research on detecting abnormal activity such as falling based on sensor data. High accuracy of fall detection in daily life activities is always a practical challenge. This paper investigates different classifiers using a combined feature set that computes from Time, Frequency, and Hjorth domains using the wearable device's accelerometer data only. This study also employs Particle Swarm Optimization (PSO) to find the parameters of the Random Forest classification, which aims to improve the accuracy of the fall detection system. The experimental results on the UP-Fall dataset have shown a better performance than the study of L. Martinez-Villasenor et al. ombining the RF classifier with PSO also improves the stability and performance of the model.**

Keyword— **Fall detection system; classification model; feature extraction, Particle Swarm Optimization; accelerometer**

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