## **NOHAYO**

## **Smart Solutions for Wearables**



# **Activity and Sports Library**

## **Fall Detection Algorithm**

The elderly population is growing rapidly. Falls are a serious medical and social problem among the elderly. We have developed an algorithm that continually looking for fall events using the 3D accelerometer sensor available in wearables such as watches, rings, and bands.

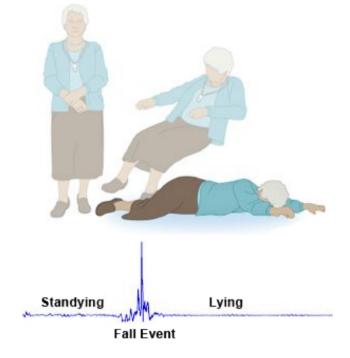
A wearable device company can use this algorithm and allow emergency call initialization and location sharing when a fall is detected.



#### How does it work?

We've collected 129 sessions of people falling in different ways (forward, backward, lateral, when stepping down stairs, during activity, from bed, etc.). Moreover, we also used available data sets from the web containing hundreds of falls (also real-life falls which are hard to collect).

We used this database to develop a ML-based model that accurately detects fall events following by an abnormal lying\semi-lying posture. The solution is working on 3D acceleration signals monitored from a wrist (watch), a finger (ring), or the ear (earbuds or hearing aid).



### Fall detection algorithm performance

The algorithm is implemented in embedded C and can run on wearables like a smartwatch, ring, and earbuds\ hearing aids that has a 3D accelerometer, and a DSP unit.

	Sensitivity	Specificity	Accuracy
Wrist	96.56%	95.25%	96.12%
Finger	96.12%	94.51%	95.74%
Ear	97.8%	96.5%	97.3%

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