

# Activity Classification using 3-axis Accelerometer and Pulse Oximeter Wearing on Wrist for the Elderly

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## ABSTRACT

In this paper we propose new criteria to classify daily life activities using accelerometer and pulse oximeter. As a result, once the device decides in emergence, it sends a short message to server and then connected to the u-Healthcare center or emergency center and one's family.

## Categories and Subject Descriptors

[Programming Languages]: We used the LabView programming language from National Instruments.

## General Terms

Experimentation

## Keywords

Activity, Classification, Accelerometer, Pulse oximeter, Elderly

## 1. INTRODUCTION

In this research, we classified the activity type of elderly in daily life. Recent researches classified the activity type with the real action such as walking, standing, sitting, lying etc. But actually this kind of classification does not help for the decision of emergent status of an elderly. So we suggest new concept of classification criteria.

## 2. MATERIALS AND METHODS

### 2.1 System Overview

We extracted acceleration data oxygen saturation data from our monitoring device in developing. Data were moved from memory of monitoring device to PC via USB port. Sampling rate is 10ms/sample and converted by 12bit depth.

### 2.2 Activity Classification

We suggest new concept of classification criteria. We categorized activities with the motility of real action. The upper most criteria will be normal and abnormal activity. The lower criteria may be 'small or large movement', 'periodic or random movement', 'no movement or shock'.

### 2.3 Classifying Algorithm

Fig. 2 shows the flowchart of activity classifying algorithm. Once we start the algorithm, the accelerometer in the device is powered on. The acceleration data are acquired with the speed of 100 samples/sec. And then the acceleration data are low-pass filtered with the 5Hz cut-off frequency.

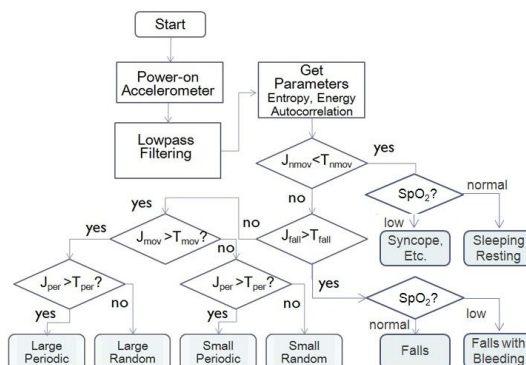


Fig. 1. Flowchart of activity classifying algorithm

## 3. RESULT

Fig.2 shows the classified result for successive various activities. Once we classify the elderly activity to abnormal we further investigated the accurate status with the reaction button or pulse oximeter. If we can classify a person's status to normal or abnormal, we can make more powerful investment in case of abnormal status.

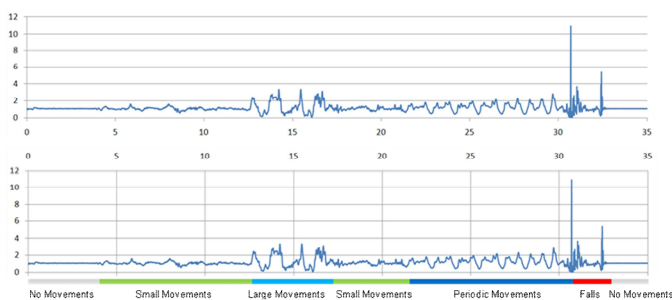


Fig. 2. Classified results for successive various activities according to our algorithm

## 4. REFERENCES

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