

Multi-label classification for physical activity recognition from various accelerometer sensor positions

ABSTRACT

In recent years, the use of accelerometers embedded in smartphones for Human Activity Recognition (HAR) has been well considered. Nevertheless, the role of the sensor placement is yet to be explored and needs to be further investigated. In this study, we investigated the role of sensor placements for recognizing various types of physical activities using the accelerometer sensor embedded in the smartphone. In fact, most of the reported work in HAR utilized traditional multi-class classification approaches to determine the types of activities. Hence, this study was to recognize the activity based on the best sensor placements that are appropriate to the activity performed. The traditional multi-class classification approach required more manual work and was time consuming to run the experiment separately. Thus, this study proposed the multi-label classification technique with the Label Combination (LC) approach in order to tackle this issue. The result was compared with several state-of-the-art traditional multi-class classification approaches. The multi-label classification result significantly outperformed the traditional multi-class classification methods as well as minimized the model build time.

Keyword: HAR; Accelerometer; Multi-label classification; Multi-class classification; Smartphones