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# Recognizing Physical Contexts of Mobile Video Learners via Smartphone Sensors<sup>☆</sup>

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## Abstract

Current studies can effectively recognize several human activities in a single semantic context, but don't recognize the semantics of a single activity in different contexts. The main challenge is the conflicting phone usages as well as the special requirements of the energy consumption. This paper tests a classic learning scenario regarding mobile video viewing and validates the proposed recognition method by comprehensively taking the recognizing accuracy, effectiveness and the energy consumption into consideration. Readings of four carefully-selected sensors are collected and a wide range of machine learning algorithms are investigated. The results show the combination of accelerometer, light and sound sensors is better than that of acceleration, light and gyroscope sensors, the features with respect to energy spectral don't improve the recognition accuracy, and the system reaches robustness in a few minutes. The proposed method is simple, effective and practical in real applications of pervasive learning.

*Keywords:* Physical context, smartphone sensors, context recognition, mobile video learners  
*2016 MSC:* 71.35.-y, 71.35.Lk, 71.36.+c

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## 1. Introduction

In the last decade, the rapid development of mobile Internet technology has promoted the widespread use of smart devices in daily lives. Various software components and built-in hidden units can be easily and wirelessly connected to the Internet. This new computing environment is known as the pervasive computing, and it further incubates the conception of pervasive learning as its deep penetration into the education domain. The context is a core term of pervasive learning that characterizes the situation where an entity is. The entity can be any object usually interacting with the surroundings. The recent literature on advanced learning technologies categorizes the

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