

Assessing the effort of exercise using low cost sensors

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1 Abstract

Children are being affected by the problem of excessive weight, as of 2013, 23.8% of boys and 22.6% of girls being overweight or obese [1], having a greater likelihood of cardio-metabolic risk factors and remaining obese as an adult [2], with a chance of being obese as an adult exceeding 50% after six years of age [2]. This alerts to the need of a proper close monitoring of children of young age, guiding them throughout the years, motivating healthy and active lifestyles. Recent studies also suggest that certain behaviours in children, like a low level of moderate to vigorous physical activity, short sleep duration and high level of sedentary activities like TV viewing are some of the most important correlators for child obesity [3] and major diseases prevalence [4]. New technology has been introduced in schools, with interactive whiteboards, computers and video projectors present in many classrooms. Although mobile phones in general are still prohibited by schools, smartphones brought new functionalities that may be useful in the classroom environment, such as note taking and calculations. With the development of new applications that take advantage of these devices, and more specifically of their set of sensors, they might prove a useful and effective education tool.

Comparing the physical activity and the effort applied in class between different students is one of the objectives of this work. Developing a reliable means of student activity comparison, using different physical characteristics and values gathered from different sensors is important, and will allow the teacher to compare activity statistics between different students for a better assessment and student monitoring throughout the school year.

The objectives of this work are twofold. Firstly, the development of a mobile application able to gather data from different low cost sensors coupled to a user when performing several activities in a gym. Secondly, the analysis of the collected data (in the cloud) should result in a data reduction approach leading to the test and validation of an effort estimator that can be used as an effective tool to student assessment in physical education classes. The deployed solution should present different analysis tools and recommendation systems both for students and teachers.

2 Objectives and Tasks

T1 To review the related literature

T2 To select the test samples, hardware, and experimental set-up

T3 To collect the raw data

T4 To analyse the data and propose a data reduction approach

T5 Validation of an effort measure

T6 To write up a MSc thesis and a scientific paper

3 Timetable

T1 1 month

T2 1 month

T3 1 month

T4 2 months

T5 2 months

T6 2 months

4 Expected Results

- 1 journal paper
- 1 MSc thesis

5 References

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[3] P . T . Katzmarzyk et al., Relationship between lifestyle behaviors and obesity in children ages 9-11: Results from a 12-country study, *Obesity*, vol. 23, no. 8, pp. 16961702, 2015.

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