

PHYSICAL ACTIVITY INTENSITY MONITORING OF HOSPITAL WORKERS USING A WEARABLE SENSOR



Fig. 1 – Smart Badge – a wearable sensor used to monitor physical activity intensity.

INTRODUCTION

Adequate levels of physical activity correlate with the prevention of health conditions. Hospital workers could benefit from monitoring their physical activity since they experience several disorders associated with shift work. This work presents an approach for classifying physical activity intensity of hospital workers wearing a Smart Badge (Fig. 1).

METHODOLOGY

A decision tree was trained for classifying physical activity intensity into four different levels: sedentary, light, moderate, and vigorous.

- **Participants:** 20 people participated in this study (14 male and 6 female) with an average age of 27 ± 3 years old;
- **Data Collection:** accelerometer data was recorded while simulating activities of hospital workers. Dataset was divided into train (15 participants) and test (5 participants) sets;

- **Classification and Evaluation:** data from the Smart Badge accelerometer was used to compute its magnitude (Fig. 2). Magnitude signal was segmented into fixed length windows and time domain features were extracted. A decision tree was trained and then used to classify the activity intensity levels of the test set.

RESULTS

Table 1 shows the results of the activity level classification of the test set, which reached 83,21% as an overall averaged accuracy across all activity intensity levels.

Table 1 – Confusion Matrix: true (rows) vs predicted (columns) labels.

	SEDENTARY	LIGHT	MODERATE	VIGOROUS
SEDENTARY	978	69	0	0
LIGHT	346	602	17	0
MODERATE	0	159	831	3
VIGOROUS	0	0	4	552

CONCLUSIONS AND FUTURE WORK

Monitoring physical activity intensity of hospital workers enables them to identify intensity of work and monitor the amount of effort they invest in each shift. Future work will focus on validating the model with shift workers performing work activities at the hospital.

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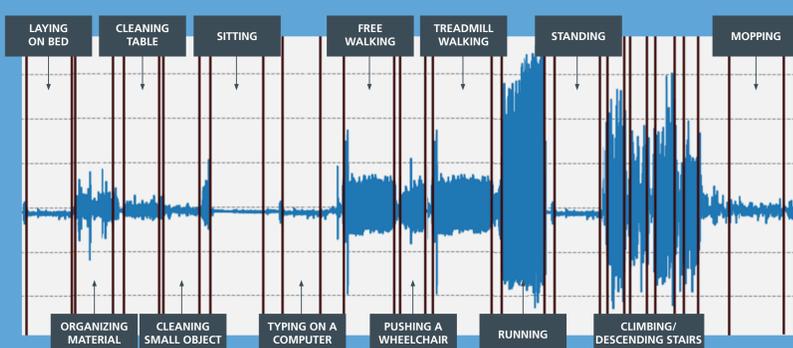


Fig. 2 – Acceleration magnitude signal of the activities performed.