Fetching Connected Pedometer Data to Analyze Patients Walking

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INTRODUCTION

The World Health Organization recommendation is 10,000 steps a day. The generalization of connected pedometers has turned this theoretical number into a practical objective. Pedometers have proven useful to promote a more active lifestyle in the global population. They can also give a concrete answer to the need for remote monitoring of patients. For example, with arteriopathic patients, medical benefits of walking mainly rely on the number of daily episodes of extended walk.

OBJECTIVE

The aim of this study is to obtain accurate data of the spontaneous daily activities of patients using a connected pedometer.

PRELIMINARY RESULTS

Initial tests with 4 users showed that we were able to accurately track trampling periods, periods of slow walking, and sustained walking periods. The Web tool has been validated and can easily fetch and data export.

TOOLS and METHODOLOGY

Patients will be equipped with a Withings' "Pulse O2" for a period of 7 days. This device can monitor steps, elevation, distance, calories or heart rate. These figures are associated to a user's account and can be fetched through a dedicated Application Programming Interface (API). The API provides multiple services such as "get intraday activity" which allows to recover walking data with a sampling of 1 minute (up to 1440 records per day). We developed a dedicated Web tool to fetch API data using PHP. To detect continuous episodes of walking, data samples from daily activities are evaluated in term of energy consumption by calculating Metabolic Equivalent of Task (METs). Each walking episode is then reconstituted by detecting consecutive samples with similar METs value.

CONCLUSIONS

Connected pedometers store quantity of useful information in term of medical data. Their analysis may reflect daily walking habits, highlight any patient handicap, and offer the potential of a personalized re-training walking program for each patient, whereas, until now, they only had general advice.