



## A platform for rehabilitation adherence management for stroke patients.<sup>†</sup>

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### 1 Motivation

Stroke, one of the common neurological diseases, is a leading cause of long-term disability. About 17 million people suffer a stroke each year with an incidence of about 250/100000/year worldwide. The number of survivors doubled between 1990 and 2010, and will reach 77 million by 2030 according to epidemiological projections [1, 2]. Stroke is a main cause of long-term disability often causing permanent disability in the upper and/or lower limbs. More than 75% of individuals lose their ability to walk after stroke [3,4] and intense rehabilitation treatments are required to reduce disability effects and to recover most of the lost functionalities.

### 2 Method

One of the main issues in the rehabilitation of stroke patients is the evaluation of efficacy of the therapy. This is particularly true in the post acute phase during self-managed rehabilitation in which the patients need support to correctly execute specific exercises. In this work we present an IoT platform for the management of rehabilitation activity with particular emphasis to the movement monitoring and therapy adherence management.

The architecture (Figure 1) is composed by a set of wearable sensor and suitable equipment installed in the patient's house. Sensors are coordinated with a common bluetooth HUB that integrate signals and transfer them to a remote infrastructure. Patient can autonomously start an exercise session, follow the program via a web application, finish the program and interact with the remote server to receive history parameters about its health status.

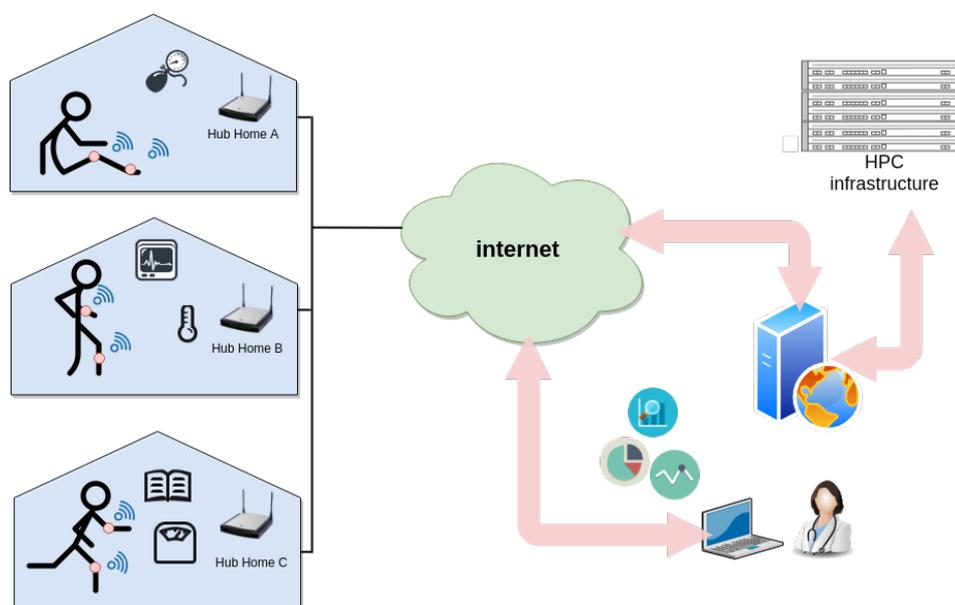


Fig. 1 Architecture of the IoT platform

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The web application (Figure 2), accessible from a mobile system (smartphone or tablet) allow both patient and doctor to monitor the rehabilitation program according to an established reference.



Fig. 2 Web Interface

### 3 Results

The integration of measures from motion sensors (accelerometer) together with values from other wireless-wearable sensors (EMG) into a unique data warehouse allows both a real-time monitoring of relevant parameters and the evaluation of the adherence of the rehabilitation program in respect to the expected outcome.