

Movement Tracking

using Bluetooth Low Energy

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Abstract : With the ever rising costs, non-uniformity in procedures and localized medical data in healthcare, eHealth and mHealth technologies strive to develop pervasive, low cost, uniform and ubiquitous health monitoring from the comfort of one's home. While the costs of rehabilitation can be about €60 per session and about 10 sessions are required on an average with a physiotherapist, a motion capture system with therapeutic feedback could provide a highly economical alternative with a one-time payment of €50-€60 only. The Motion sensing over Bluetooth Low Energy (MoBiLE) system aims to design, implement and evaluate a low cost, lightweight and energy efficient remote exercise monitoring system for physiotherapy. This monitoring system processes a real time data stream from motion sensors and utilizes this data to animate human motion using augmented reality. A prototype MoBiLE system built with Mbed, nRF51DK, Python and Processing is designed, implemented and evaluated. This system uses Bluetooth Low Energy (BLE), a low power communication protocol and implements a novel Power Efficient Data Adaptive (PEDA) algorithm to conserve battery life. This proposed solution allows the user to use the motion capture sensor with a coin cell battery which can last for hours. Initial experiments comparing this algorithm with other raw data techniques show that this technique is able to conserve considerable power and produce comparable animation results.