Abstract

Undergoing rehabilitation through physiotherapy exercises plays a vital role in maintaining and regaining the physical strength of patients who suffer physical impairments due to accidents or ageing. However, this repetitive and regular process can be boring and often causes the subject to lose interest in performing the required exercises. Exergaming approach tries to alleviate such problems by integrating physical exercises into virtual gaming environment. We aim to create an interactive and intelligent rehabilitation exergaming system called **RehabMe** by exploiting Natural User Interface (NUI) devices such as the Xbox Kinect and OpenSpace 3D game engine. RehabMe aims to sustain patients' interest in performing exercises through immersive and interactive game play while carrying out an embedded assessment of both quantitative and qualitative measures of rehabilitation progress. With our solution, patients are no longer required to wear any sensor on the body as advanced imaging and skeleton tracking provided by the Kinect can be used to detect and recognise both static and dynamic movements according to the exercises performed. The interactive exergaming encourages the subjects to actively perform physiotherapy exercises by breaking the monotony of the repetitive exercises by immersing into virtual game play environments. The embedded assessment features enable physiotherapists to remotely monitor the progress or improvements made by subjects using quantifiable parameters such as repetition, response time, accuracy, number of correct moves, etc. So our solution facilitates the growing needs of home-based rehabilitation by enabling an enjoyable and relaxing interactive experience for patients and fulfilling clinical requirements of therapists.

Keywords: Rehabilitation, Physiotherapy exercises, Natural User Interface, Xbox Kinect, Interactive exergaming, Embedded assessment.