

Postural balance analysis using force platform for K-theragame users

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Abstract:Serious games based physical therapy is currently gaining a lot of interest by the physiotherapists and game developers that are using new natural user interfaces devices to assure an easy interaction between the user under rehabilitation and his avatar immersed in a virtual reality scenario. Arm motion training, as part of stroke rehabilitation program, can be one of the main objectives of the serious games, and was the object of several serious games developed by our group, the previous works being followed by postural stability monitoring during rehabilitation developments. Thus, the balance analysis on static conditions and during the arm rehabilitation based on implemented serious games represents the objective of the work. The system presented in the paper combine Kinect Serious Game Framework and a developed force platform architecture characterized by Bluetooth communication capabilities that provide the data related to postural balance to be processed together with the upper limb training data for general evaluation of stroke rehabilitation outcome. Experimental results, including time and frequency analysis of the data obtained by the Kinect and force platform, are included in the paper.

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I. Introduction

Nowadays the number of patients recovering in rehabilitation clinics after a stroke event is increasing caused by different factors including stress and alimentation. According to the World Health Organization, 15 million people suffer stroke worldwide each year. Of these, 5 million die and another 5 million are permanently disabled [1], and the remaining 5 million having to work for their motor recovery, which include training postural control and upper limb physical rehabilitation activities. The common practice regarding the evaluation of motor capabilities during the training period implies the usage of index or scales [2].

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