Executive Summary

An interdisciplinary research group, with wide experience on Physiotherapy and Artificial Intelligence, has developed the Automatic Digital Biometry Analysis System (ADiBAS). The system is composed by a depth sensor, a set of led landmarks a conventional camera, PC station and user-friendly SW application. The developed software is able to automatically detect the set of landmarks located on the body of a subject and obtain high precision biomechanics measurements about distances, angles, curvatures and other indicators useful to support diagnosis and treatment in physiotherapy and sports.

Introduction

Posture evaluation is a procedure of physical analysis included in the main directives of the American Medical Association. The systems based on Digital Biometry allow the analysis of posture alterations in a fast, didactic, and easy way. In order to allow the physicians to evaluate these deviations, it is necessary to have a comfortable, reliable and low cost technology. The proposed technology contributes to the easy diagnosis of muscle-skeleton alterations, being an effective system for analyzing evolution during treatment.

Description

We present a novel fully-automatic system that combines color and depth information to segment the human body as well as the markers distributed among it. The system is automatically calibrated without the need of using artificial artifacts. The user only needs to put the markers on the subject and make a photo to acquire photometric and depth information. The system then automatically computes a depth map to the sensor using infrared mapping technology, segments human body and markers, and processes the data so that it is automatically formatted and displayed to the physician for objective support for diagnosis. The system is cheap, customizable for different postural feature measurements, non-invasive, intuitive, and fast in practice. The calibrations, detection module from Computer Vision and Artificial Intelligence, as well as the different feature measurements, have been deeply analyzed and validated, obtaining high precision, robustness, and reliability of the novel technology. An example of automatic landmark detection and biomechanics measurements extraction is shown in Figure 1.

Goal

The group is looking for a license, but other collaborations may be considered.

Intellectual Property

This project is protected by intellectual property registration

Reference:

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Contact

Isabel Durán, PhD
Email: iduran@fbg.ub.es
Tel: +34 934 037 281

Figure 1. Automatic postural measurements.