For measure the gait parameters many devices have been developed, these devices can be classified in wearable sensors (WS) and non-wearable sensors (NWS). The WS are the devices that have to attach something to the person for realize the track of the legs and extract the spatiotemporal parameters, in this case the sensors that have usually been implement are: Ultrasonic, pressure, goniometers and inertial measurement units (IMU), which are the most common in this category. The non-wearable sensor are the opposite, these do not need something attached on the subject’s body for do any kind of measure, here the common methods to extract the spatiotemporal parameters are image processing and floor sensors [1].

Both kind of sensors have advantages and disadvantages, in general the NWS need a controlled environment, so that the laboratories is the place that these sensors are usually used, another disadvantage is the price of these sensors because normally are expensive, but there are few systems that are cheaper, as the Kinect. Accuracy, non-restriction in power combustion and less external factors interference are the general advantages of the NWS [1].

The WS obviously have the opposite advantages and disadvantages, these are able to be implemented in other type of environments and are cheaper, but have less accuracy than the NWS and need battery [1].

A lot of works have been developed for do the validation of systems that measure the spatiotemporal gait parameters using the previous mentioned sensors, likewise the implemented methods to validate those systems are several, therefore some test might not be strong enough. The ideal in a validation would be use a gold device with a very high accuracy to compare the measure of the proposed system, as in [2] and [3].

In [2] the idea was propose a motion analysis system using a wireless ultrasonic sensors and with 10 healthy subjects who walked on a treadmill, they got the root mean square error (RMSE) between a motion analysis eagle 8 cameras system and their proposed device. The propose in [3] was evaluate the implementation of a gait analysis system based on a Kalman filter using inertial sensors and they use a 8 meters GAITRite system and a video camera (GoPro HD2) with reflective marks to get the gold measures, as the same as [2] they got the RMSE to validate their system.

Other systems as [4] used a motion analysis cameras system as a gold measures, but they didn’t compare all the spatiotemporal parameters that the system got, in this case the knee’s angles was the only parameter validated. Others papers used another types of validation, typically a synchronous video camera is the gold measure as in [5] and [6]. Some validation was focused only determinate the error of the legs position, that is because those systems could detect the gait phase which allow that the system be able to extract some spatiotemporal parameters as cadence or step weight. So that if the detection and legs’ tracking is right the distance and time of each stride or step should be correct, this is the case of [7] and [8]. In [7] they attached a marker on the shoes, so that each step position was represented as a dot on the floor, and in [8] they used the sensibility a specificity of the step detection to validate the system.

In the review paper about systems that are used to get the gait parameters between the years 2012 and 2013 [1], the laser range finder (LRF) is mentioned as an optical sensor that have been used for track legs and extract parameters but they did compare with other systems. In our review we search in IEEE explore, PubMed and Sensors, using the following key words: laser range finder gait parameters, laser range finder gait, LIDAR gait parameters, LIDAR gait and scanner gait parameters. In these review only one paper about gait parameters estimation using a LRF (or similar sensors) without a walker after the year 2011 was founded [6]. They developed a system that uses a LRF to track the legs and estimate the risk of falling in elderly subjects, for that they extracted the stride length and walk speed. The validation consisted in ask 16 elderly to do Multi-target stepping task (MTST), in which participants step on assigned colored targets and with a synchronous video camera, they compare if the legs track was right or not. The results were great but the spatiotemporal gait parameters were not validated.

Others two papers were found [9] and [10], in which a LRF and a LIDAR were used to detect legs and extract the spatiotemporal gait parameters, these papers were published before 2012 and don’t compare the results with another validated system. Usually these sensor are implemented on walkers the extract information about legs or gait, as in [11] and [12] or are used in the control of actives walkers [13] [14]. So the LRF has the advantages of a NWS and also can be used in many types of environment for legs detection and extract spatiotemporal gait parameters, but is a sensor that have not been much studied in this area.

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