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An Analysis of Kinect-Based Human Fall Detection System

Abstract
Human fall detection system has become one of the most important things especially for indoor environment application. This system has been used in respective areas of elderly care and at child care houses. It helps to detect any human fall and will alert the caretaker about the accident. Kinect sensor can be used to perform the detection due to its capability in scanning and tracking human as well as its affordability. One of the widely used algorithm in human fall detection using Kinect is the skeleton-based method where it works by calculating the distances of every joint with the floor-plane. The joints are detected using the skeleton space coordinate system. When the floor-plane is not visible and the Y-coordinate is less than the given value, a fall is detected. Due to its widely usage, there is a need to study its performance to know the best condition that this algorithm could offer. Performance of selected parameters were observed through a few experiments conducted using Visual Studio as the interface. In this work, a mobile-based Kinect is used due to its mobility and better future implementation for indoor navigation. The best parameter can be identified quantitatively in order to choose the ideal scene that can be used to detect human fall detection using this skeleton-based method. Among the parameters are the distance of the human to the Kinect, the light intensity, the time to track human and the speed of fall. It can be concluded that the most ideal conditions would be at a distance of 3 meters to 3.5 meters with lightings of 1007 lux and of 2 persons at the scene. These conditions can be helpful for others when considering to use the algorithm for human fall detection using Kinect.

Keywords
Human fall detection; Kinect-based; Skeleton-based human detection