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Article

Adaptive Directional Bounding Box from RGB-D Information for Improving Fall Detection

Apichet Yajai and Suwanna Rasamequan*

Abstract: Fall detection for aging people is still a mainstream research focus for the current aging society. Tools that are simple and inexpensive but have high accuracy rates are needed. RGB-D information retrieved from a home entertainment system was used to detect falls using typical bounding boxes techniques. These techniques have limitations. This research introduced the Adaptive Directional Bounding Box that made use of a comprehensive bounding box and a dynamic state machine in a new way to detect falls. The proposed approach offered a way to track and analyze continuous data streams of the visual images to automatically predict a fall event prior to the fall state in a single-phase instead of the typical two-phases. This can significantly affect the survival or severe injury of the elderly. The proposed method can improve accuracy by 25.5% and the response time by 21.31% on average as compared to existing approaches.

Keywords: Fall Detection; Comprehensive Bounding Box; Center of Gravity; Aspect Ratio; Kinect; Elderly Care; Dynamic Tracking; Stream Data; Arbitrary Movement

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1. Introduction

Most nations are facing an aging society and this is unavoidable because of the improved healthcare technology. People can now live a longer life. Working people's lifestyles have changed. They are no longer believe that having children of their own is necessary. This situation has led to an average birth rate that is decreasing and has also led to a society where elderly people are left alone at home more often. Lately, falls are found to be a major cause of fatal injuries that affect the elderly

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