

Smart Room For Elderly People

#¹Vidya Ashtul, #²Nishigandha Panchal, #³Kanchan Waikar,
#⁴Bhagyshree Kshirsagar

²nnishigandha.17@gmail.com

PICT Pune.



ABSTRACT

Elderly people often need assistance in carrying out their daily activities. They need to be informed about their medicine and diet schedule along with a personal care taker to assist them which is not always feasible taken in consideration the increasing number of elderly population compared to other age groups. We can provide a technological solution to this problem by minimizing the human efforts required in doing the above activities. We are using kinect sensor to capture live data of person & accordingly track the daily routine of them & give help in case of emergency.

Key words: Elderly; Kinect camera; Gesture Recognition; feature extraction

ARTICLE INFO

Article History

Received: 31st May 2016

Received in revised form :

31st May 2016

Accepted: 2nd June 2016

Published online :

3rd June 2016

I. INTRODUCTION

Now a days the increasing old age population and increasing number of shelter homes or old age homes makes it tough to provide personal assistance to every old person and thus increasing the risk of potential accidents that can be caused due to lack of personal care. Hence it is necessary to make use of advance technologies in order to provide personal assistance. Thus ideas of building smart rooms in old age homes came into existence. However, most of the time such idea is confined to specially built, expensive rooms due to the high cost of sensory hardware and software. In order to make some of those ideas realized for average-income households, we could resort to lower cost devices and focus more on smaller space like a personal room.

Kinect sensors are able to capture motions of a human and present them as a series of time dependent skeletons. They have been utilized in many fields such as entertainment, security, and health care. Particularly, they could be applied to assist the elderly population of which the number has been increasing substantially around the world when compared to other age groups. This work proposes the idea to create a system which could assist the elderly people to follow their regular schedule and also provide them assistance in case of emergency.

Kinect camera is a device made for entertainment for Xbox360. It can detect a human's body and voice. Initially Developed for games, it has subsequently been used with other entertainment devices, e.g., for controlling a movie playback with body movements or sound.

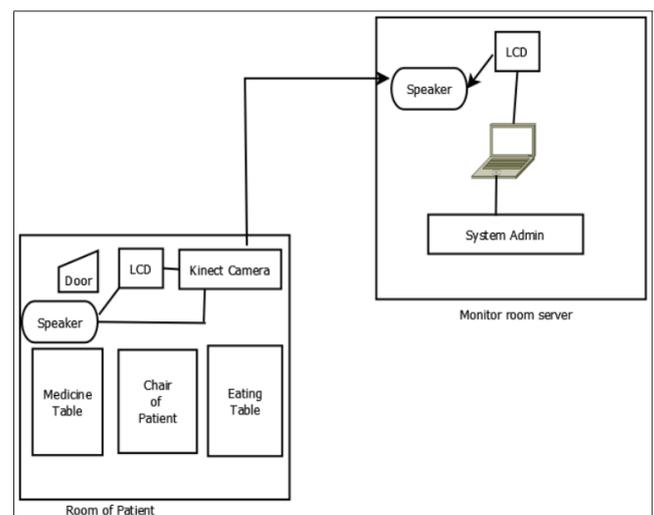


Fig 1. Architecture of proposed system

II. BACKGROUND

A. Motion tracking

Recently, the field of marker-less motion capturing has made great progress, especially with the wide use of Microsoft Kinect. The motion capturing method provided in Kinect SDK [16] is a typical machine learning based method. It infers the body part to which each depth image pixel belongs based on randomized decision forests trained with a large and highly varied depth image data set.

B. Kinect Sensor Characteristics

In this section we analyze and discuss the characteristics of the Microsoft Kinect RGB-D sensor used in this paper. The sensor consists in an infrared (IR) camera, an IR projector, and a standard color camera. To measure depth, the sensor follows the principle of structured IR light [16]. The depth image has a 640x480 pixel resolution at 11 bits per pixel. Interestingly, not all bits are used for encoding depth: out-of-range values (e.g. below minimum range) are marked with the value of $V_{max} = 1084$ while the minimum range has been experimentally determined to be $V_{min} = 290$. Thus, only 794 values (10 bits) are used for encoding depth information in each pixel.

C. Sobel Edge Detection

The Sobel operator is used in image processing, particularly within edge detection algorithms. Technically, it is a discrete differentiation operator, computing an approximation of the gradient of the image intensity function. At each point in the image, the result of the Sobel operator is either the corresponding gradient vector or the norm of this vector.

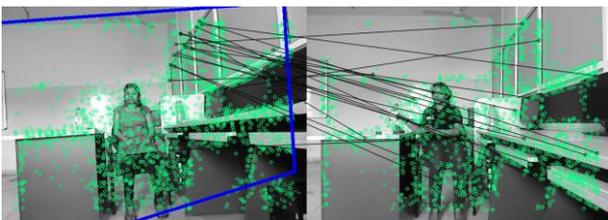
D. Feature Detection & Image Matching Using SURF[2]

Interest point detection

The SIFT approach uses cascaded filters to detect scale-invariant characteristic points, where the difference of Gaussians (DoG) is calculated on rescaled images progressively. In SURF, square-shaped filters are used as an approximation of Gaussian smoothing.

Matching

By comparing the descriptors obtained from different images, matching pairs can be found.



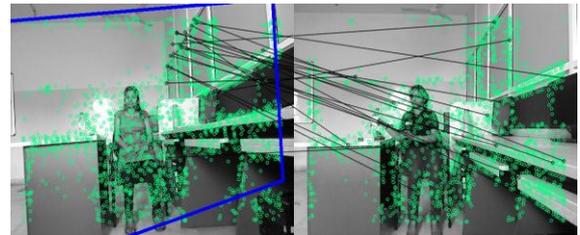
E. KNN Classifier

In pattern recognition, the ***k*-Nearest Neighbors algorithm** (or ***k*-NN** for short) is a non-parametric method used for classification and regression. In both cases, the input consists

of the ***k*** closest training examples in the feature space. The output depends on whether ***k*-NN** is used for classification or regression:

In ***k*-NN classification**, the output is a class membership. An object is classified by a majority vote of its neighbors, with the object being assigned to the class most common among its ***k*** nearest neighbors.

III. RESULT ANALYSIS



IV. CONCLUSION

In this paper, we have used Kinect in our proposed system as a live video capturing system for data acquisition and then identify the gestures and postures on the person. We have recognize and track the various hand gestures and body postures using Microsoft Kinect sensor. Kinect allows capturing dense, and three dimensional scans of an object in real time.

This paper could be extended to other environments and applications beyond this one. For instance it could be used in Yoga Teaching

by identifying the posture of the person and mapping it to predefined dataset to check if its being done properly or not and in hospitals to track moment of patient in comma for short period of time and other such applications.

V. REFERENCES

- [1] Yootana Booranrom, "Smart Bedroom for Elderly using Kinect",2014.
- [2] Salvatore Gaglio," Human Activity Recognition Process Using 3-D Posture Data",2014.
- [3] Yun Li," Detection of Patient's Bed Statuses in 3D Using A Microsoft Kinect",2014.
- [4] Dengsheng Zhang and Guojun Lu ," A Comparative Study on Shape Retrieval Using Fourier Descriptors with Different Shape Signatures",2014.
- [5] Jaya Shukla ."A Method for Hand Gesture Recognition