

# AUTOMATED TRACKING FOR DISABLED PATIENTS

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## Abstract

This module is based on the automatic tracking for disabled patients. In this module we propose a automated tracking system for disabled patients. As there is no method for paralytic patients or disabled patients to send direct notification to the doctor or nurse if any emergency. For this process we use the image processing technique. Image processing is processing of image using mathematical operation by using any form of signal processing for which the input is an image , video stream or photograph graph or the output of image processing may be either an image or set of image. Three main phases of this system are Background Subtraction, Blob analysis and fall detection. The background subtraction is used for gesture reorganization and blob detection is used for pose identification. The main goal is to Decrease the death rate of disabled patient.

Here we propose system in that the cameras will continuously capturing the image of a patients that it is in the form of video stream. These currently capture image is compare with the image which is store in database if there is best match that means there is a emergency situation so that automatic notification is send to doctor as well nurse also for the alarm is generated. So that if any emergency occurs the alarm will turn on. Thus the death rate of disable patients or paralytic patients will reduce.

**Keywords:** Image processing, Background subtraction, Pose detection, fall detection,

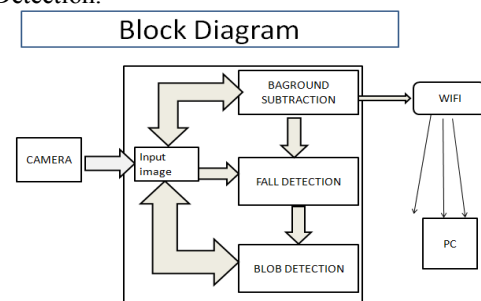
## 1. Introduction

As we know, there is no method for paralytic patients or disabled patients to send direct notification to the doctor or nurse if any emergency. Here we propose system in that the camera wills continuously capturing the image of patients is in the form of video stream. These currently capture image is compare with the image which that store in database if there is best match that means there is a emergency situation so that automatic notification is send

to doctor as well nurse also for the alarm is generated. so that if any emergency occurs the alarm may be turn on. Thus the death rate of disable patients or paralytic patients will decrease.

There are four modules in this system:

1. Gesture Reorganization.
2. Pose Identification.
3. Fall Detection.



**Fig. system architecture**

**Gesture Reorganization:** Gestures considered as the most natural expressive way for communications between human and computers in virtual system. Gesture recognition is the mathematical interpretation of a human motion by a computing device. Gesture recognition, along with facial expression reorganization voice recognition, eye movement tracking and lip movement tracking are components of what developers refer to as a perceptual user interface. Gesture recognition is a one of the user interface for providing real time data to a computer. In Gesture reorganization we use Background Subtraction method.

### 1.1 Background Subtraction:

In which the moving human body detection is the most important part of the human body motion analysis, our purpose is to detect the moving human body from the background image in video sequences, and for the follow up treatment such as the classification of target, the human body tracking and behaviour understanding, its effective detection method. Human motion analysis

Concern the detection, tracking and recognition of people behaviours from image sequences that is from humans. According to the result of moving object detection research on video sequences, so we will use algorithm for detecting moving objects from a static background scene, to detect moving object from video stream based on background subtraction. We set up a dynamic threshold method to minimize the effect of illumination. Then, median filtering is applied to remove the noise and solve the background interruption difficulty then the moving human bodies are accurately and reliably detected from input video stream. The experiment results show that the proposed method runs exactly and fits for the real time detection.

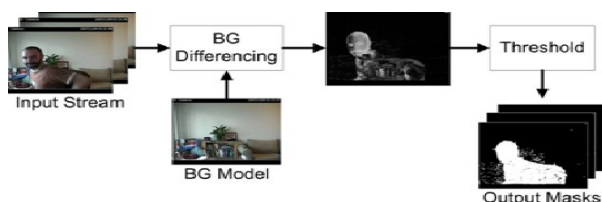


Fig. Background subtraction

**1.2. Blob detection and Analysis:**

A Blob is group of connected pixels in an image that share some common property. For many high vision purposes, detecting the low level objects in an image is of great importance these objects which can be 2D or 3D, are called blobs. Blobs are appear in different ways depending on their scales and can be detected using local operation in multi scale representation. Blob occurs in many shapes and places. Blob detection can use different methods and application. It shows that blobs can be defined and localized in different ways and that each method has its own strength and shortcoming. Automatic detection of blobs from image datasets is an important step in analysis of a large scale of scientific data. Before going into detail on blob detection, first some definitions of a blob are given. Lundeberg defines a blob as being a region associated with at least one local extremism, either a maximum or a minimum a bright or a dark blob. Regarding the image intensity function, the spatial extent of a blob is limited by an saddle point, an point where the intensity stops decreasing and starts increasing for bright blobs and for dark blobs also. A blob is represented as a pair consisting of one saddle point and one extremism point. just describes a blob as a rectangle shape with an homogeneous area, i.e. a constant contrast, which becomes a local extremum under sufficient amount of scaling.

Methods:

1. Template Matching
2. Watershed detection

3. Spoke Filter
4. Automatic scale detection
5. Sub-pixel precise blob Detection
6. Effective maxima line detection

**Human Body part Detection:**

Human body part detection is useful for pose detection of a human. Here we try to capture the location and movement of

It is applied on video images and it tries to capture the location and movements of head and hands to identify behavioral states. The position, size and angle of head and hands are tracked using color analysis, eigenspace based on shape segmentation and filters. Hand and face regions are detected as blobs using 3D Look-Up-Table (LUT) of skin color samples. Regions that are incorrectly identified because their color matches to the skin colors, are a disregarded through the segmentation and comparing the subspaces of the face and hand candidates.

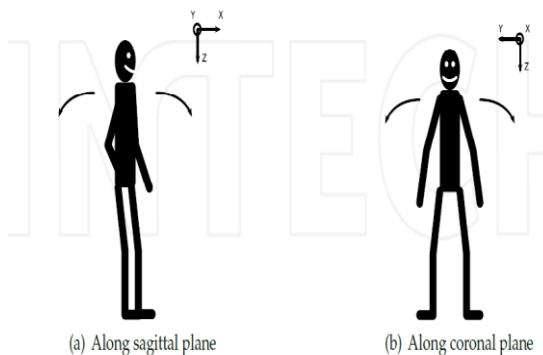
**1.3. Fall Detection:**

A fall may be defined as it is the study on the kinematic analysis of the human movement of body. A fall is just like unconditionally fall on ground or some lower level. Fall is loss of a consequence

Sudden come on ground. It is always able to adapt this fall definition to address the specific goals that researcher wants to get it or also pursue it.

Fall detection is depending on the depth image analysis. As we know this is different from other conventional methods, if the pedestrians are partially overlap or partially occluded, the method is able to detect fall events and has many advantages as the mention below

- Advantages:
1. It may happen with single or many pedestrian.
  2. Recognition of human or other objects



As a term human anatomy a fall usually happens between one of two planes that called as sagittal and coronal planes. Figure 1(a) shows the sagittal plane that is an X-Plane imaginary plane that travels through the top to bottom of the human body that is vertically, dividing it into left portion and right portions. In this situation a fall along the sagittal plane may be occur either forward or

backward. Another Figure that is 1(b) shows the coronal Y-Z plane, which divides the body into two sections that are dorsal and ventral that is back and front portions.

The coronal plane is orthogonal towards the sagittal plane and therefore it may be considered for lateral falls that is right or left. If the person is standing without move the body, that is, he or she is in a static position, the fall occurs in the down direction. The x, y and z are usually chosen in order to have positive z values of the acceleration when the human body is falling down.

**Typical fall scenarios:**

**• Fall from standing**

- It lasts from 1 to 2 seconds.
- In the beginning the person is standing.
- A patients fall along only one direction and the center of mass move along a plane
- The height of head may be different from height when patients are in standing and the height of the floor.
- At the time of fall it is free fall.

After the fall head lays in virtual circle that is centered in position of feet before the fall and has height of the patients.

**• Fall from chair**

- It may be about 1 to 3 seconds.
- In the starting the height of head may varies from height of to height of floor.
- At the time of fall it is free fall
- After falling patients body may near to chair.
- After the fall it may be free fall.

**• Fall from bed**

- Fall is about 1 to 3 seconds.
- At the start person is lying.
- After the fall it may be free fall.

**Technological approaches to fall detection:**

Following are the categories of devices based on the technology used:

- Vision-based approach
- Environmental approach
- Wearable approach

A vision based method use camera that continuously capture or record the movement of the patients and acquired data send to image algorithms that recognize the pattern of fall to the alarm

Vision-based approaches can be classified as:

1. Inactivity detection: main aim behind this method is after fall patient lies on floor without move
2. Body shape change analysis: patient change his pose after fall.
3. 3D head motion analysis: it only monitors the patient position and velocity of his head.

4. The main limit behind this is time and cost of installation. The limited application that is only where there is the camera and privacy violation. That use of Environmental devices is an approach which is based on the installation of sensors in the places where we will monitor the fall. When people interact with environment, infrared or pressure the sensors on the floor detect a fall. The problem here is the presence of false negatives, for example, a fall that occurs on a table is not recognized or detected.
5. Both Visual based approach and Environmental device approach require a pre built infrastructure, and this enables the use in hospitals and houses. In the Wearable approach, one or many wearable devices are worn by the patients. They are usually equipped with movement sensors like accelerometers and gyroscopes that values are transmitted via radio. This solution offers advantages such as low installation cost that is indoor and outdoor, small size and offers the possibility to also acquire physiological data such as blood pressure, ECG, EEG.

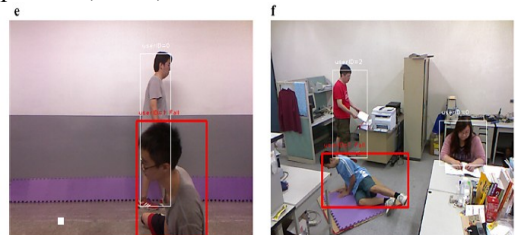


Fig. fall detection

**2. Literature Survey:**

As we know in current scenario of the hospital, there is no any method which has direct notification from Patients to doctors if any emergency is occurs.

In July 2013 Image processing is use to conduct analysis during sleep for children with ADHD Using video stream as a input. But problem with the system is that it does not investigate the difference of body movement cycle between children with ADHD and normally developed children.

In May 2013 fall detection for the patients was proposed it was effective and was able to detect the fall from any angle with great accuracy but problem with the system is that it was required extra hardware for each patient.

The system was required accelerometer device and there is need to wear the device to detect the fall, so the hardware cost was high.

### 3. Benefits / Applications:

- The most common application this technique is Sign Language Detection. In this computer recognition of sign language is an important problem for enabling communication with hearing impaired people. In this we can give the efficient and fast method for identification of number of fingers opened in a gesture representing an alphabet of binary sign language.
- The important application is for Old Age people At Home. In this we provide safe and comfortable care to aged people. In this we obtain the correct activity and location information for an old aged person. This algorithm is work on indoor tracking system for old people living alone.
- This technique is mainly used for partially or fully Handicapped People. It concentrates in particular on system that use image and video processing for converting the visual data into an alternate rendering modality that will be appropriate for a blind user. Such alternate modalities can be auditory, haptic or combination of both. This is where image and video processing plays a crucial role.

The important use of this technique is At Home Level for Patients. This work is motivated by the patient at home. In this suppose the patient is an ambulatory patient who requires a greater level of attention such as individual with chronic conditions, elderly patients etc.

### 4. Conclusion:

- In this paper we describe the image processing image processing, gesture reorganization and we can use different techniques are used this system, so here we design module which is use to detect the disable patients.
- For this module we use the different techniques. Here we cannot say that this particular algorithm is use in this process. The algorithm will change at runtime when our system is in progress.
- Here we design a module is use to detect disable patient or paralytic patients and send the direct notification to doctor or nurse. This system is very useful in emergency situation. thus now we can say that death rate of disable patients or paralytic patients will decrease.

- In future we will try to design the system for physically handicapped person, Alzheimer patients, Epilepsy patients. This system is also used to detect the sleepwalker people.

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