CRITICAL PATIENT MOVEMENT MONITORING AND DATA LOGGING IN REAL TIME USING CONSECUTIVE FRAMES ANALYSIS METHOD

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ABSTRACT

Patient movement monitoring system is a system that is used to detect patient's movement changes. Those changes may be either abnormal behavior or unusual changes that are done by the patient in the absence of doctor. This paper presents the implementation of patient movement monitoring system for those patients that are taking medical treatment in both local and foreign hospitals with the help of Consecutive frames analysis approach. A lot of techniques have been proposed for this problem but the main issue that has been highlighted in this paper is that there are less number of experienced doctors and nurses in both local and foreign hospitals. In this technique, we have to arrange a digital camera that will keep an eye on the patients. This camera will automatically save the unusual changes and abnormal behavior done by the patient in the absence of doctor. These images can then be analysed by the doctor at a later point of time. This research work is very helpful for critical patients like coma patients, dialysis patients and for those who were on bed for a long period. Because in these situations, only a minor movement made by the patient is detected that plays an important role in their treatment.

Keywords: Consecutive Frames, Human Changes Capturing, Patient Movement Monitoring,

1. INTRODUCTION

Change Detection performs an important role to identify content changes in images. The main purpose of this research is to identify whether a pixel or a region between two images are significantly different or not.[3] This identification is done with the help of a novel approach i.e. consecutive frames analysis approach.

In this work, we will discuss a medical application of patient movement monitoring in hospitals and diagnosis centers via video recording with the help of a digital camera. Automatic capturing of the patient movement changes in the monitoring video may provide this application in the following ways. Firstly, capturing unusual changes and abnormal behavior in a scene so that an alarm can be whistled in case of an unusual change in the absence of doctor. Secondly, Controlling the camera automatically to present an optimal view of the subject. Thirdly, Compressing the video contents to reduce the bandwidth in data communication.[3]

We will divide the whole part of the patient's body into three parts i.e. Upper patient body, Middle patient body, and Lower Patient body. Our camera will keep the records of all of the three parts of the patient’s body separately. Results of all parts of the body will also be shown separately. When any movement will occur in any part of the body that movement will be shown in the respective part of the body in the form of graphs and the remaining two graphs will be shown with no changes. With the help of these graphs, we can easily identify that in which part of the body have been made changes at what time or whether there is any abnormal behavior or unusual change.

2. RELATED WORK

There is much research work in the field of patient movement monitoring system over the past decades. Some of the work done has been discussed below for better understanding the concept of patient movement monitoring via video recording. A motion capture system. A medical application of patient monitoring via video recording, which is commonly used in hospitals for clinical diagnosis[1]. Remote based computer vision technology improves the quality life of elder people with decreasing costs [5]. A motion capture system MOCAP (Motion Capture) is a device that is used for monitoring moving objects. MOCAP is widely used in the field of scientific community, medical, engineering [1]. Deals with many kinds of problems that the patient monitoring system still suffers from such as

(1) lost of information.
(2) Blur images usually taken by the mobile phone which give incorrect or inaccurate information to the doctors in emergency cases.
(3) Less number of doctors and nurses with respect to the large number of patients in both local and foreign hospitals leads to difficulties in recording all the medical information properly [4].

3. THE PROPOSED ALGORITHM

The Detection of the movement of patients in hospitals via video recording is one of the most important and fundamental technologies to develop the real world computer vision systems, such as video monitoring system. The usual method for detecting moving objects is very simple.

Firstly, we set the digital camera on the patient lying on the bed. This camera will automatically take frames and we will draw the graphs of patient's body with the help of the frames taken by the camera. Then patient will made movement in any part of his body. Camera will again take frames of the patient’s body. Then we will compare both the consecutive frames taken by the camera and detection of the movement made by the patient will be identified easily.

We use consecutive frames analysis technique for detecting moving objects. This approach compares the consecutive frames taken by the camera and identifies the movement made by the patient. Consecutive frame analysis approach is robust.

4. EXPERIMENTAL RESULTS

As we earlier discussed, We will divide the whole part of the patient’s body into three parts i.e. Upper patient body (upto Neck) Middle patient body (Below Neck and upper part from legs) and Lower Patient body (legs) . Fig. 2(a), shows all of the parts of the patient's body that we have divided and plot the graphs of all parts of the body separately as shown in Fig. 2(b). When the patient lying on bed made movement in his body, the graph thus made will show us drastic changes. The noise and other changes were excluded in the significant intensity changes.

Figure 1: The Proposed Algorithm

Figure 2(a): Three Parts of Patient’s Body

Figure 2(b): Data Logging of All of the Three Parts in the form of Graphs Separately
Critical Patient Movement Monitoring and Data Logging in Real Time Using Consecutive Frames Analysis Method

5. CONCLUSION

In this study, a new method of patient movement monitoring system is proposed. By comparing the consecutive frames of patient taken by the camera, we detect the various changes made by the patient’s body. The identification of the appropriate changes made by the patient is shown in the form of graphs. This research work is very helpful for critical patients like coma patients, dialysis patients and for those who were on bed for a long period. Because in these situations, only a minor movement made by the patient is detected that plays an important role in their treatment.

Experiments have shown that this method produces accurate results with providing the movements in each part of the patient’s body in the form of graphs.

REFERENCES


