Elderly Patient Monitoring System

Project ID: 17-105

Abstract Document

B.Sc. Special (Honors) Degree in Information Technology

Submitted on 24/03/2017

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Sensor configuration and anomaly detection through health monitoring sensor inputs

Heart rate and SpO2 (percentage of the oxygen amount in the blood) are two main parameters to check the health level of the patients who are suffering from respiratory issues important due to frequent changes in heart rate and the SpO2 level.

Setting up suitable sensors according to the physical parameter such as heart rate and spo2 is required. Captured incoming inputs should be sent to the computer via micro controller. Analysis of the heart rate is necessary to monitor the arrhythmia and further analysis on derivation of the SpO2 is required. Finally a construction of a classification model will be done to classify the data in order to interpret.

If any arrhythmia of the heart beat or an abnormal deviation of the oxygen percentage in blood is (SpO2) detected by the system it will alert the caregiver to be equipped for the event.

Abnormality detection of the behaviors

Patients with respiratory issues are having restlessness in case of a situation where they need more oxygen. Restless patients tent to change their position in the bed to gain more oxygen in to the body. Therefore monitoring the behaviors of the patient is much needed. The main objective of this component is to clarify the normal behaviors and the abnormal behaviors identify the abnormal behaviors of the patient.

In here Data of both the normal and abnormal behaviors of patients should be collected using the camera. And then construct a classification model for detecting the behavioral abnormalities. In here "Optical Flow Analysis method" will be used with Image processing and machine learning to fulfill the task.

If some abnormal behavior get detected by the system it will give some alert or some kind of reminder to the caregiver in order to be prepared for adverse situation.

Abnormality detection in emotions

The identification of the emotions of a bedridden patient is a must whereas he/she may not have the ability to convey their feelings in more appropriate manner while absence of the caregiver. Therefore figuring out the abnormalities in the emotions of the patient let the system to alert the caregiver when in need.

In here data which is needed to detect emotion is collected via a video camera. And the captured data are send to a pc for the analyzing and for filtration processes. Since it is mainly

targeting on bedridden patients, sometimes detecting face will be somewhat difficult due to movements in patient. In a situation like this the particular video frames should be reoriented. Then Filtered data will be classified using neural networks to detect normal and abnormal emotions

If an abnormality is detected the caregiver is notified by a message where necessary reactions can be performed.

Respiratory Sound Analysis

Auscultation or the listening to the internal sounds using a stethoscope is an effective way of diagnosing the respiratory sounds and identify related diseases in the respiratory system. Monitoring the respiratory sounds of the patients who are suffering with respiratory problems is a must to avoid any adverse events. Capturing of the respiratory sounds and further classification of the sounds is required to identify abnormal respiratory sounds.

Machine Learning has proven to be the best solution to analyze the respiratory sounds. Captured sounds using stethoscope will send to the PC and normalization and filtration processes should happen prior to feature extraction. Correlation will be used as the feature extraction technique and Artificial Neural Networks will be used for classification.

This component will eases up the duty of the caregiver and save the amount of money which is needed for doctor’s diagnosis at hospitals and clinics.