Sri Lanka Institute of Information Technology

Project Topic Assessment – 2017

Research Problem:

Majority of the elderly bedridden patients are getting treatments under their own roof and require special caring with continuous human monitoring. Problem with the human monitoring is that it requires well trained caregiver with sound knowledge and skills to keep eye on the patient all the time. Finding well qualified caregivers/private nurses is not an easy task while they are limited and already assigned for particular jobs. It requires high concentration level even for well trained and qualified caregivers to monitor the patient in every single second. There are several computerized monitoring systems available to date, but which are lack of many mandatory features worth to their extreme cost. Therefore an inexpensive system which can monitor multiple necessary facts about the patient's health would be ideal. Luxury of an automated patient monitoring system is that even a family member can become a caregiver to look after the patient since all the monitoring tasks is done through the system. System will eventually eases up the duties of the family caregiver where he/she can manage the day to day work as while taking care of the patient and can save the amount of cost which is needed for a separate caregiver or a nurse.

Research Area:

- Sensor configuration and anomaly detection through health monitoring sensor inputs - Internet of things(IOT)
- Abnormality detection in emotions - Machine Learning
- Abnormality detection of the behaviors - Machine Learning, Image Processing
- Anomaly detection through audio inputs and drug reminder - Audio Signal Processing

Solution proposed:

Computer vision and IOT based approaches are proposed for Sensor configuration, detecting anomalies of sensor inputs, detecting abnormality in emotions and the behaviors, anomaly detection through audio inputs and finally alert the responsible person with an appropriate alerting system. A drug reminder is also a part of the system where it can notify the caregiver to give the right dose of drug at the right time for the patient. The system has the capability to monitor patient's heart rate, the oxygen percentage in blood (SpO2) with the identification of the anomalies regarding those physical parameters. The particular sensors will be used to monitor heart rate and SpO2. The sensors will be connected to a pc through a wireless channel to detect anomalies. The identification of the emotions and the gestures 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. The bedridden patients are naturally obstinate in behavior and the fact may negatively impact to their health condition due to various kinds of accidents. Therefore behaviors of the bedridden patients always should get to the consideration by the person who is taking the care of the patient. Due these advantages of monitoring the behavioral patterns of the patient, the proposed system includes a feature for identifying the normal and abnormal behaviors to indicate an occurrence of an anomaly. Sleeping sessions, sudden wakeups and falling down will get in to major consideration. The identification of the noises coming from the patient or the surrounding objects might be important, when it comes to bedridden patients. Anomaly detection through audio inputs will be focusing on identifying the anomalies in the noises which will made by the both patient and the surroundings. Person who is taking care of a bedridden person has a high responsibility on his/her shoulders where sometimes he/she may forget to give the drugs of the patient in time with the right amount of dose. Proposed solution will send a reminder to the responsible person's mobile phone in the right time to give the right drug with the right dose. Person who is taking care of the patient will be notified whenever an anomaly is detected by the system.

Technologies to be used:

- Visual feature detection and extraction
- Optical flow analysis
- Audio feature extraction
- Deep learning
- Mobile Technology
- Data Communication

Team Members:

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Acceptable: YES/NO

Changes proposed:

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Any other Comments:

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Approved by Project Coordinator:

Signature: _____