Medicon Medical Sciences
Volume 2 Issue 4 April 2022
Editorial

A Digitized Remote Home Health Care Approach to Patient Monitoring, Comfort and Recovery

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Received: March 14, 2022; **Published:** March 22, 2022

Home health care management for dwellers and the elderly is much of a desire than a real time opportunity for most. The future points to homes having a room designated for health care just as a kitchen, bathroom or dining room form essential rooms in a house. This choice of location however must be outfitted with equipment capable of monitoring health, logging and retrieving data for remote communication to those involved in virtual medicine, for diagnosis.

Personnel from organizations and homes wishing to measure and manage their own on-site health information are faced with inability to conduct appropriate instrumentation and data collection methods as well as analysis of the data collected. Automation is slowly emerging as a technique for monitoring worker and patient health vitals as people perception, probably due to lack of trust in such a system, is not in favor with replacement of the systems currently in use. Automation too has its challenges in a human environment and as such requires some feedback on situation awareness for operator performance.

Given the fast pace of living and the ever present COVID 19 pandemic one would have expected any new method of detecting and monitoring early signs of medical conditions would be welcome. One such method for managing pandemic spread, quarantine and general home health management has seen a digital device designed for measuring sp02 levels, skin temperature, heart rate, patient falls, wet diaper status, sleep apnea, patient comfort/movement and sheet/bed condition for the elderly, convalescing and patients, from the comfort of the home. The method comprises: a bedroom, an OximeterPlus instrument for measuring vitals, WiFi, internet, virtual wellness doctors for immediate pre-diagnosis and response, thereby reducing the chance of fatality or further health deterioration where necessary.

These units have found favor with doctors practicing virtual medicine in Trinidad and Tobago where the units were manufactured. This is a country that lacks adequate health service to support the population size and as such would improve health quality through the implementation of this system. The data from the units are stored in the web and easily retrieved with WiFi and internet connection.

Method

Based on the patient's likes and dislikes a machine learning algorithm was set up and used to forecast the sequence switching on and off of tv, radio, a/c for the patient from practiced behavior. These units are low voltage and current devices and provide data all day once connected. They also have very little circuit component stray which supports their reliability and accuracy once calibrated. The data collected for spo2 and pulse rate were measured against a clinically approved one for 300 data points from one subject for calibration. The test result indicated that the difference between the unit readings and those of the standard were not statistically significant at a p-value of 5%.

Once committed to bed, the patient's movement is restricted and comfort will be a main issue as elasticity of the spinal discs is brought into question. In order to try to keep the nutrients mobile to maintain health status, an artificial device was designed to work with the units to provide some compression and rarefactions using sound waves, along the spine. The concept design includes a

vibrating unit that propagates longitudinal waves at varying frequencies to resonate the spinal column and is attached to the back via a jersey as a wearable device. This unit will also include probes to provide temperature changes along the spine to induce and promote patient comfort during times of discomfort from being in one location for prolonged periods.

During the time the spinal unit is attached, data are collected on the patient's vitals, health and comfort. These are fed to a central system for statistical analysis and associations between predictors of the health vitals.

The drawbacks to the comfort concept using the wearable device is in the coupling of the device to the attire and spine, attaching the vibrator to the color of the attire and ensuring the vibrations are not dissipated, achieving resonance, patient size and medical condition and maintaining it. These are not insurmountable but will require some trial and error analysis.

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