

Introduction

The need for timely medical contact has never been more important than during this pandemic. Due to recent covid restrictions frequent hospital visits are discouraged. Chronically ill patients require routine monitoring for improved health living.

The aim of this project is to develop a Remote Patient Monitoring System based on e-health for effective delivery of healthcare. RPMS is a proposed solution for monitoring patients health status and receiving doctor's prescription while staying at home. With RPM, the modern consumer can access, engage and account for their health at their ease and convenience, wherever, whenever and however they like. Additionally, RPM provides patients with expanded levels of education, feedback & support in achieving better health outcomes.

There are three categories of stakeholders to support the use of technology: the patients/communities, healthcare workers & department of health.

Problem Definition

There are wearables that track the heart rate or the calories burned but what about patients with chronic diseases (e.g, heart, cancer, diabetes, etc). Remote monitoring devices are needed for surveilling the patients.

The Remote Patient Monitoring System is a set of technologies enabling health care workers to record synchronal changes in a patient's health data and use it in a treatment plan. It's an integral component of the broader telehealth industry and e-health domain. The RPMS system includes a patient-side mobile application that collects data from different electronic wirelessly connected measurement devices and sensors. The data recorded then would be sent to the healthcare cloud. Doctor's can perform diagnosis using the data collected through hospital-side web applications. The AI-powered RPM system will keep track of patients' proclivity to progress to high severity by analysing real-time patterns and trends. If high severity is detected, the healthcare officials may be notified so that they can take informed decisions.

Background

1. Ignosis provides Patient-Managed Bluetooth kit (RPM) for chronic disease management, extending the reach of the clinic and healthcare specialists where they can talk directly to patients. It includes Custom Tablet, Weight Scale (BMI), Blood Pressure Monitor, Glucometer, Pulse Oximeter and more. The system tracks a person's behaviour patterns, establishes what 'being well' looks like and then flags if there are any significant changes.
2. AltumView Systems consists of a visual sensor, a cloud server, and a mobile app for both Android and iOS. The sensor uses a deep learning algorithm to track the activities of seniors. The smart device sends notifications to family members or care providers in the

event of leaving the "safe zone," falls, or other emergencies. The sensor also includes face recognition, daily activity statistics, and fall risk assessment.

3. Biofourmis allows physicians to remotely monitor patients' vital signs via a clinician mobile app or web dashboard. Its branded armband biosensor Everion continuously measures blood oxygenation, blood pressure, temperature, and a variety of other physiological parameters. Patients can also report their symptoms to a care team using a mobile app. The system uses machine learning algorithms to combine sensor data with the patient's medical history to create a unique, real-time profile. This profile is used to forecast unfavourable outcomes and to alert clinicians to suspicious events. Following discharge, the monitoring usually lasts three to six months.

Since these FDA approved solutions are at their early stages, the limitations are yet unknown. However, many researchers argue about the general and specific aspects associated with the use of technology. Some of the common difficulties are: technology acceptance, threats to confidentiality and privacy, lack of system interoperability, costly modern systems, data manipulation, scalability in terms of data rate & energy consumption, sustainability of connections (e.g, interruptions), etc.

Plan & Timeline

The first step is to look into the statistics estimates to understand how big the issue is and type of users affected. Then the next step is to review different case studies to gain a broader understanding with a diversity of perspectives. This will guide us in choosing/developing an effective method (e.g, Design, Implementation) for our proposed idea. Additionally, we will also analyze the benefits, limitations & ethical considerations of our proposed idea. Finally, we will demonstrate the proposed solution through a design prototype.

Progress

We have discussed more about the problem definition and the existing solutions with benefits till now. Jayex (2020) states the need for medical care during the pandemic and Bogdanova (2018) says that people can use wearables to monitor their heart rate but remote monitoring devices are needed for more complex issues such as chronic diseases. Now that we have identified the issue, Altexsoft (2020) demonstrates the underlying structure of RPMS with key components and Care Innovations (2021) outlines the benefits of using RPMS. We reviewed the different existing FDA approved RPMS with key features listed by Altexsoft (2020). Moreover, Mohammadzadeh and Safdari (2014) explains the challenges and ethical concerns regarding the implementation of Remote Patient Monitoring Systems.

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