DAYANANDA SAGAR COLLEGE OF ENGINEERING

DEPARTMENT OF MEDICAL ELECTRONICS

CardioHealth - A Home-based Rehabilitation System for Patients with Cardiovascular Diseases

DEEKSHA V | FIHA AFRA | PRATHIBHA K P | SYED FIZA

PROJECT GUIDE: PROF. SAHANA M KULKARNI

Abstract

Cardiovascular diseases are said to be the leading cause of increase in financial resources in the medical sector. A significant portion of the recovery process is the cardiovascular rehabilitation program which requires exercise as its main component. The large and ever increasing pressure on medical organizations around the world requires health care professionals to be prescribing home-based exercise rehabilitation treatments to allow patients to carry out rehabilitation with constant monitoring with the added convenience of performing exercises at home. Home-based exercise rehabilitation approaches have shown to be effectual and successful in treating conditions such as Cardiovascular Disease (CVD). Nonetheless, adhering to home-based exercise rehabilitation systems seems to remain low. Possible reasons for this are that since patients are not monitored by their respective representatives, they are not completely confident that they are performing the exercises properly or in a correct and accurate manner and that they do not receive feedback.This paper proposes CardioHealth, an interesting, gamified exercise rehabilitation platform that can help address the issue of adherence to these programmes. CardioHealth aims to be a home-based rehabilitation system for patients in rehabilitation of cardiovascular diseases with a user-friendly interface and also a doctor-patient interaction system for doctors/physiotherapists to diagnose and examine patients without face-to-face interaction. CardioHealth utilizes the Kinect V2, patients must perform exercises in front of the Kinect and results are sent straight to the patient's doctor/Physiotherapist.

Introduction

- 2 systems, Doctor (Physio) system, Patient system
- Geared towards patients in rehabilitation of cardiovascular diseases
- Patient uses patient system to perform workouts or play game
- Doctor / Physiotherapist monitors patient's results
- This eliminates the need for continuous check-ups to the Doctor's Office
- Uses Kinect 2, which has ability to monitor patients heart-rate

User Requirements

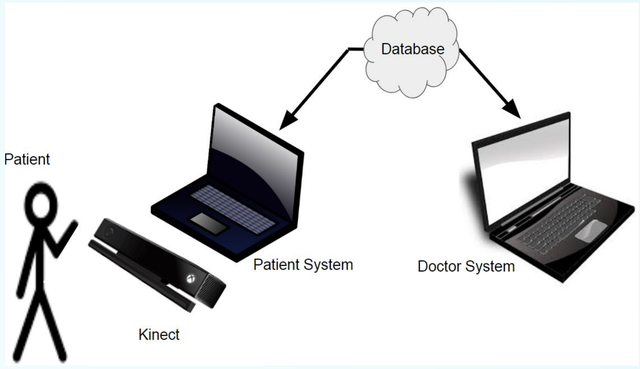
Patient System

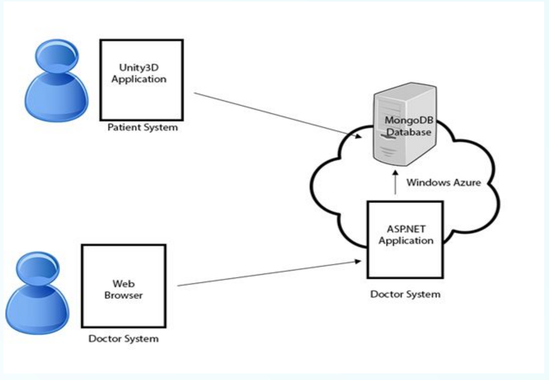
- Log in
- Perform Basic Exercise
- Play Game
- View Records (Workout)

Doctor System

- Log in
- Create Patient Account
- Select Patient
- Edit Patient Details
- Send Message
- View Records (Workouts)
- Comment on Workout

System Overview

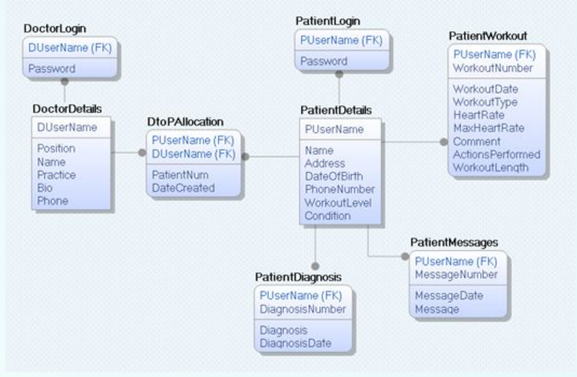




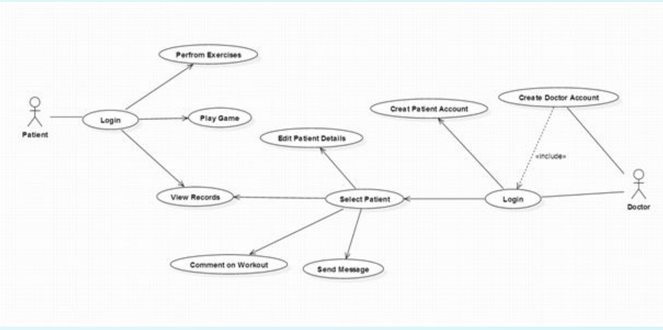
Main System Components

- CardioHealth Application
- CardioHealth Website
- Database Connection

Database Entity Diagram



Use Case Diagram



Conclusion

In the current practice of cardiac rehabilitation, where the patient is required to perform exercises at home, without ongoing feedback from the doctor/physiotherapist, the patient may lose the motivation to adhere to their program and hence lose out on a very important phase in recovery. The patient may also be faced with the inconvenience of visiting the doctor frequently just to convey the state of progress. This research strives to propose a Kinect-based framework complemented by a doctor-patient interaction system to tackle the issue. The system is designed to be low cost, easy to use, capable to support new learning styles and to ensure to the best of its abilities to provide the patient with a smooth and more successful road to recovery.