

Introduction

While consumer fitness trackers are becoming increasingly common, they are not yet incorporated into post-operative health care in any standardized way.

Therefore, this project uses a custom-built web application and commercially available fitness trackers to allow physicians to monitor the progress of a recovering patient in the weeks and months following a cardiovascular operation. Analyzing the patient's biometric data (including heart rate, activity, and sleep trends) in real time, the system notifies the physician if potentially concerning conditions arise (such as an elevated heart rate with little associated activity).

Following a cardiovascular operation, adhering to a plan of increasing aerobic activity is crucial to a strong recovery. Therefore, this application functions as a non-invasive tool to tighten the feedback loop between physicians and patients. This way, a physician can immediately receive relevant information, rather than having to wait several weeks for a post-operation checkup in which the patient might give a less-specific, qualitative overview of his or her own progress.

Physician Use Cases

- Easily invite patients by entering their email address - View each patient's heart rate and activity data as an interactive graph, clearly highlighting daily minimum, maximum, and average values

- Elect to be notified if a patient's data deviates from a specified range (e.g. "patient's average heart rate over any 10 minute interval should not surpass 140 bpm") - Append notes to a given patient's health profile

- Message patient directly from the application
- Allow multiple physicians to track a single patient

Cardiovascular Recovery Tracking System

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Application Functionality	Cu
tion Screenshot of the Physician Dashboard	If you're cu
in as John Smith, M.D. 🕂 Add Patient 🗘 Settings 🕞 Sign Out	capabilities using your
nts	
No New Alerts	
6 ✓ Email Patient ✓ View Profile	
4 New Alerts	
6 Email Patient View Profile	Ha
erts view and Heart Rate graphs on Patient Profile ry bpm / time Toggle Smoothed Data 7 1	 Fitbit fitre Smartpho Patient's internet if order to for services.
Image: series of the series	
Since 04/02/2016	This projection of the second is unique available with the second
	Additionall
m over a time period of 10 minutes, starting on 4/22/2016. The average value was 166.	and physici Center for (
teps over a time period of 1 day, starting on 4/15/2016. The recorded value was 1258 steps.	Building a
n over a time period of 10 minutes, starting on 4/8/2016. The average value was 54 bpm.	to make a s

Figure 1. Applicat

Recover Dashboard Signed

Active Patien

Jane Doe

Unread Alerts: 0 Last Data Fetch: 04/18/201 Patient Since: 04/17/2016

John Doe

Unread Alerts: 4 Last Data Fetch: 04/18/201 Patient Since: 04/18/2016

Figure 2. The Ale

Heart Rate Histor

Toggle Raw Data

Average Resting Heart Rate



John Doe Patient

Unread Alerts 3

Exceeded the set value of 150 bp Fell below the set value of 2000 st Fell below the set value of 60 bpm

🗙 Clear all alerts



SAINT LOUIS

EST. 1818 —

urrently have a Fitbit?

currently wearing a Fitbit with heart-rate es, we can provide a live demonstration own data!



ardware Requirements

ness tracker with heart rate sensor one with Bluetooth low-energy capabilities smartphone should be connected to the in some capacity at least once per day in transfer all biometric data to Fitbit's web

Conclusions

t relies on technology less than a year old ue to the field. Integrating a commercially vearable fitness device into a cardiac on program will give physicians the ability progress of patients in real-time, allowing ake changes to a medication or ion plan if a patient's data deviates from an attern.

ly, this system will be used with patients ians in a clinical environment at SLU's Comprehensive Cardiovascular Care (C4). non-invasive tool to improve the ular recovery of patients has the potential significant contribution to the fields of personalized medicine and wearable devices alike.