

# An EHR-Integrated Activity Tracking iPhone App for CHF Patients

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# Technology overview

- Sensors have enabled activity tracking market to explode.
  - \$6 Billion market by 2018 - *ABI Research*
- Consumer devices like FitBit, Nike FuelBand, and Jawbone Up
  - 250 million to expected to be sold between 2013 and 2017

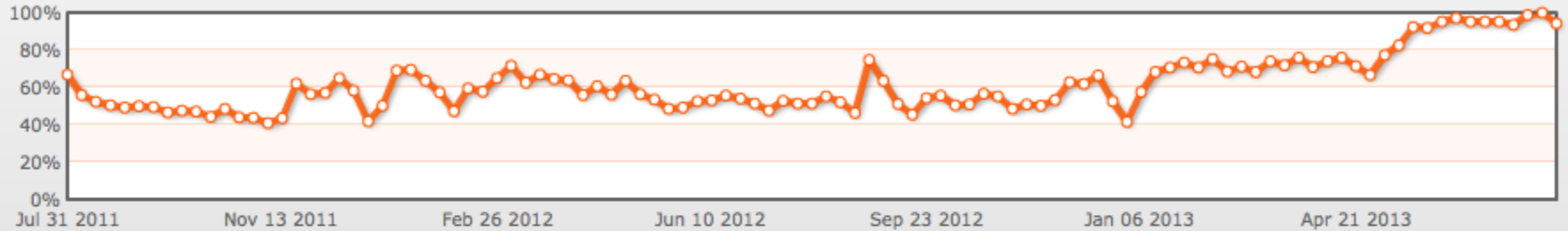
<https://www.abiresearch.com/press/led-by-the-sports-fitness-and-wellness-segment-wea>

[http://www.imsresearch.com/report/Sports\\_and\\_Fitness\\_Monitors\\_World\\_2013&cat\\_id=175&type=LatestResearch](http://www.imsresearch.com/report/Sports_and_Fitness_Monitors_World_2013&cat_id=175&type=LatestResearch)

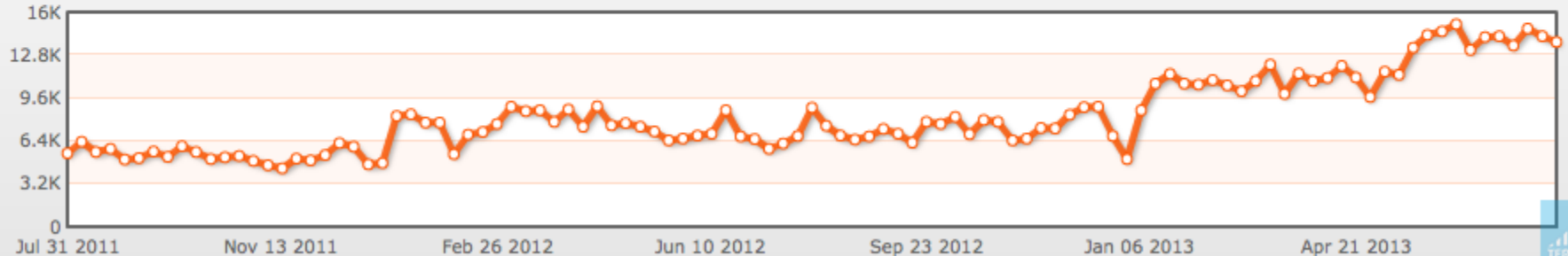


# Fitness Tracker Market Trends

**Total Sold Listings**  
Average Daily Sold Listings During Period : 1,200 - 1,300



**Total Bids**





Continuously measures  
motion data

Accelerometer,  
gyroscope, compass

Enables a new generation  
of health and fitness apps

# Monitoring Activity in Congestive Heart Failure

**Table 3** Meta-analysis results

Outcome	<i>n</i> studies	Number of patients	Statistical method	Effect estimate, mean (95% CI)	Statistical heterogeneity, <i>I</i> <sup>2</sup> and <i>P</i> -value
All-cause mortality					
<12-month follow-up	13	962	Relative risk (fixed effects)	1.03 (0.70–1.53)	0%, 0.95
>12-month follow-up	4	328	Relative risk (fixed effects)	0.91 (0.78–1.06)	41%, 0.17
All hospital admissions					
<12-month follow-up	8	659	Relative risk (fixed effects)	0.79 (0.58–1.07)	0%, 0.54
>12-month follow-up	4	2658	Relative risk (fixed effects)	0.96 (0.90–1.02)	37%, 0.19
Hospital admission due to heart failure					
<12-month follow-up	7	569	Relative risk (fixed effects)	0.72 (0.52–0.99)	16%, 0.31
HRQoL					
MLWHF	6	700	Weighted mean difference (random effects)	–10.33 (–15.89 to –4.77)	71%, 0.004
All scales	9	779	Standardized mean difference (random effects)	–0.63 (–0.8 to –0.37)	79%, <0.0001

MLWHF, Minnesota Living with Heart Failure questionnaire.

# Transforming Data to Knowledge

- Key Physician/Care Manager Questions
  1. Is the patient getting enough exercise each week?
  2. Can I be alerted if significant downward trends begin to occur in the patient's exercise regimen?

# Provider User Requirements

- Integrated with practice EHR
- Easy to understand visualizations
- Alerts of significant negative trends



# Patient User Requirements

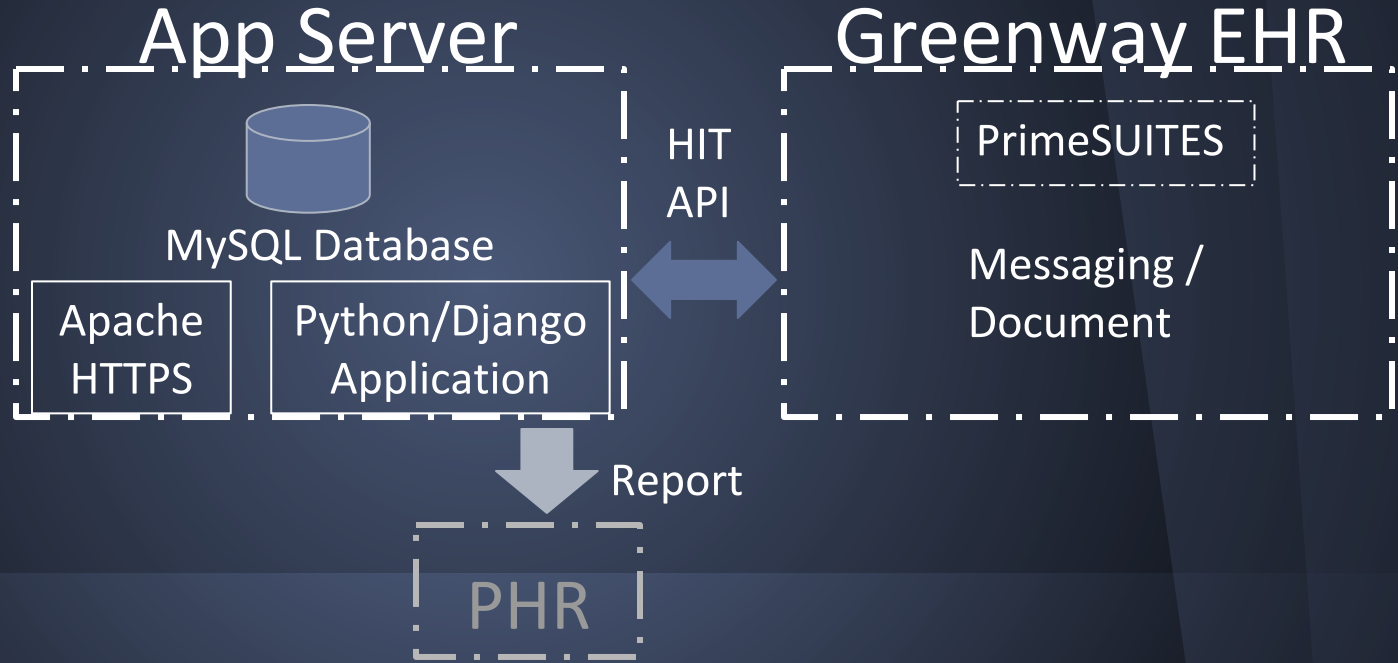
- Passive data collection



# Technical Requirements

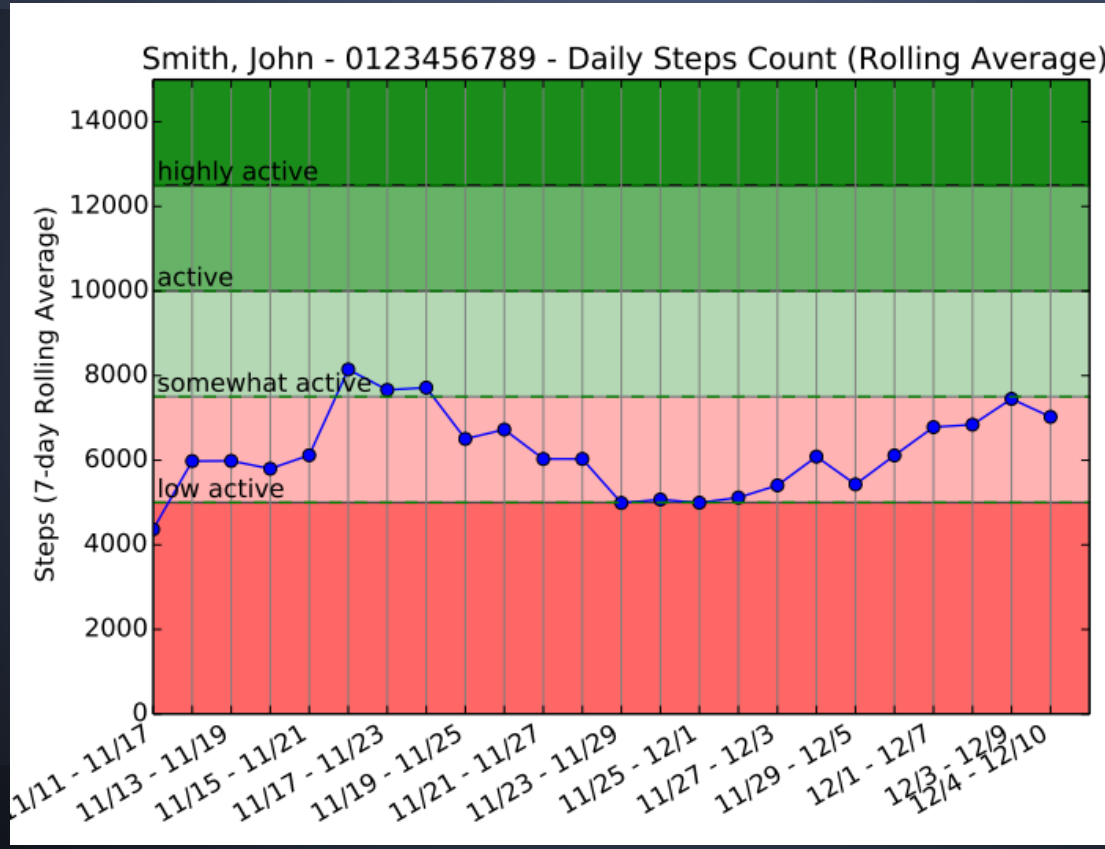
- Secure data exchange

# Project architecture



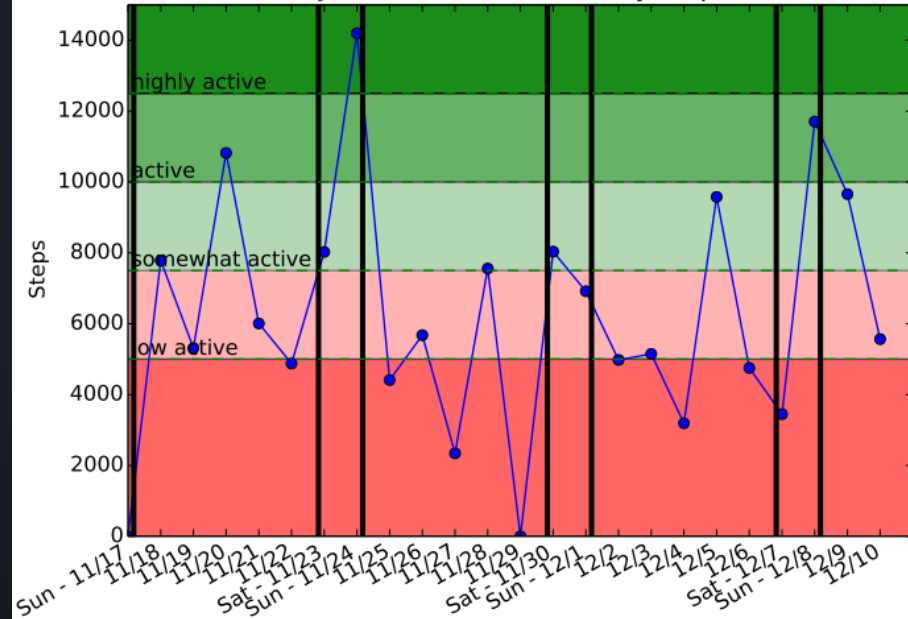
DEMO

# 1. Is the patient getting enough exercise each week?

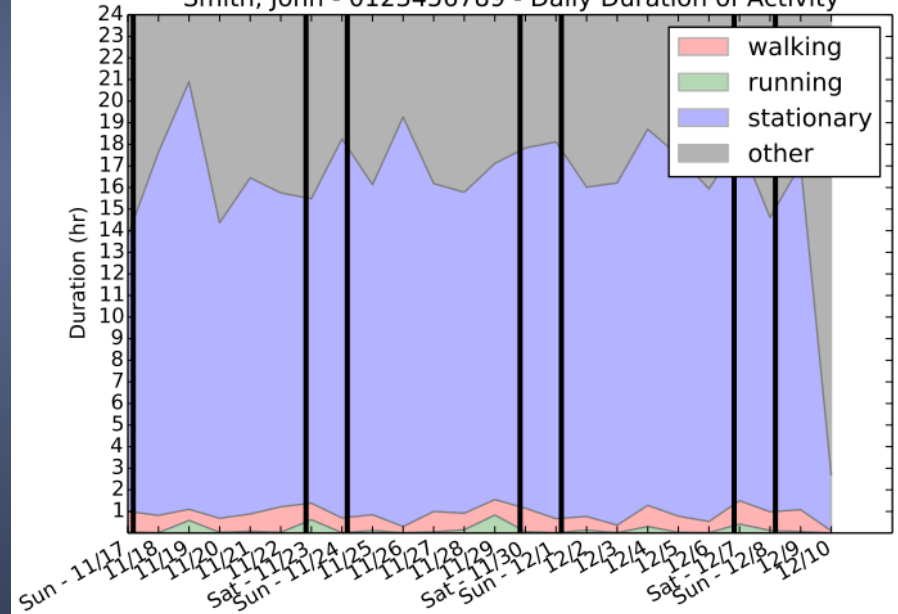


# 1. Is the patient getting enough exercise each week?

Smith, John - 0123456789 - Daily Steps Count



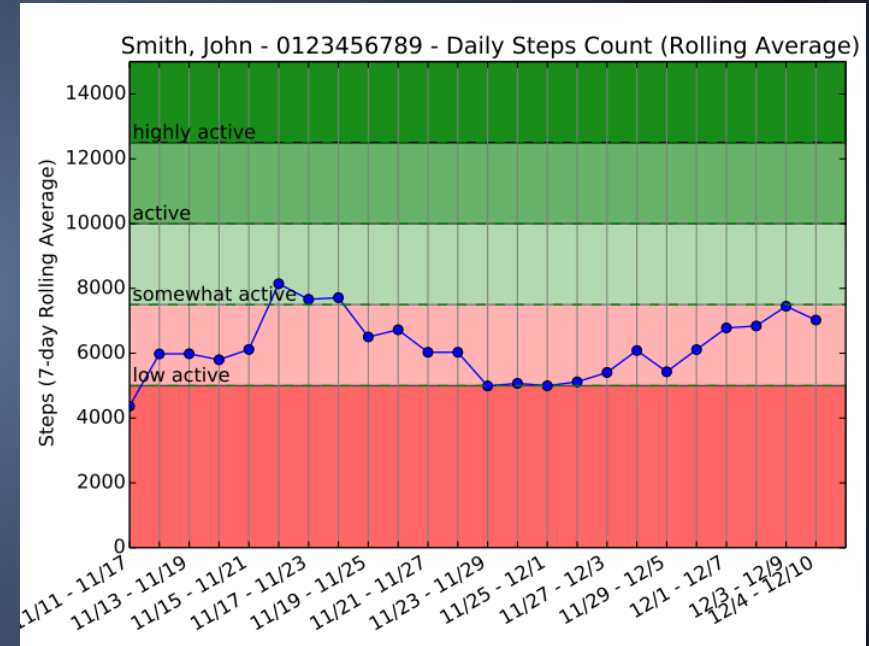
Smith, John - 0123456789 - Daily Duration of Activity



2. Can I be alerted if significant downward trends begin to occur in the patient's exercise regime?

## Algorithm:

- If the rolling average activity drops down a level for 7 days then send an alert



# User Requirements

## Provider

- ✓ Integrated with practice EHR
- ✓ Easy to understand visualizations
- ✓ Alerts of significant negative trends

## Patient

- ✓ Passive data collection



# Future Directions

- Individualized fitness plans with customizable alerts
- Lots of testing and verification
- Big Data, Analytics, and Outcomes Research

Questions?

**Back Up Slides**