Wearable Devices Technology

Introduction

Recently, the changes happening in the fitness and medical fields, especially of related wearable and electronic devices, are remarkable and revolutionary. People have never seen these wearable devices before. Small, fashionable and multifunctioning, these portable electronics can measure your daily burned calories, steps you take, miles you run and heartbeats you beat. It is believed that wearable technology will eventually change health care. According to a market research, "Wearable technology market will reach $70 billion by 2024." [1]

Commercial Applications of wearable technology

Most wearable device brands focus on their functions on basic users' fitness. The fitbit flex, one of the fitbit wristband product, can track user activity like steps taken, calories burned and distances traveled. With this unique functionality and fashionable look, the fitbit has been a success in the new market. Recently, Apple releases a watch product targeting the wearable technology market. This Apple watch not only can do everything fitbit could do, but also add a lot more. Besides adding a 3-axis Accelerometer sensor, there is a hear rate sensor in the watch. [2] With this sensor installed, users can track their heart rates and devices can utilize this data to improve their data accuracy such as overall calorie tracking. The apple device also plays the role between users and their Iphones, helping users to send and see messages, retrieve app information and even check out in the pharmacy. The competition in this newly emerged market is very fierce, Google and Samsung has their own watch products doing the similar things that Apple watch do.

Health Technology in Wearable devices

A comparison of sensors among major wearable devices could leads to technology related to health care they employed. Google, Apple, Fitbit and Samsung all have 3-axis Accelerometer sensors [3] installed in their products. This sensor could provide users' raw motion data to the processer in the device and calculate them into user activity data. However, the sole reliance of these activity data on this data decreases the accuracy of them. There are many complains about the fitbit wristband counting walking data into running one. [5] To improve the accuracy of activity data, Google and Apple add heart rate sensors. Google has optical heart rate sensors (PPG) and Apple has custom heart rate sensors installed. This particular sensor can easily distinguish the different activity mode of users based on their heart rate.

Improvements of Health Technology in Wearable devices

Health Technology can be improved by adding more sensors into wearable devices, as most devices are very similar and could not differentiate. The activity data of users is not directly linked to the health of users. This data tracks users' behaviors and can be categorized as passive data. If wearable devices can provide more active data like ECG waveform of the heart [6] and blood oxygen levels for users, so that users can track their own health anytime. The wearable devices will become a private doctor to each user and inform users when they are sick. There are viable blood oxygen level measurement methods that can be implemented in the wearable devices. [4] Its utilization can save the room for the extra heart rate sensor, improving the functionality while minimizing the device size.

[1] Wearable Technology 2014-2024: Technologies, Markets, Forecasts
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[3] Triple Axis Accelerometer Breakout - ADXL335
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[4] Measuring heart rate and blood oxygen levels for portable medical and wearable devices
Available:
http://embedded-computing.com/articles/measuring-levels-portable-medical-wearable-devices/#
[Accessed: Oct 26, 2014]

[5] Fitbit counting too many steps (maybe faulty?)
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http://www.myfitnesspal.com/topics/show/905531-fitbit-counting-too-many-steps-maybe-faulty
[Accessed: Oct 26, 2014]

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