

Wearable Electronics and their Applications in Health and Fitness Trends

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Abstract: With the rapidly technology and new innovations from being the first step towards handling our life digitally PCs and mobile phones are a thing of the past now. With the emerging trend of wearable technology- devices worn on body like watches, jewellery- enables its users to work better with digital information in the real world. The amount of change in the wearable technology is significant, from wearing glasses to wearing it on your wrist. Accessories that monitor your heart rate, buzz you when you miss a call, glasses that act like a camera which records your every moment, a device that alerts when you slouch. The enhancement that enables you to strive to complete your goal acting as a motivation for you. The trend is changing rapidly with a magnificent amount of rise in demand of the products to ease your lifestyle and take a step further in achieving your goals. With the precision in sensor technology and fast computing level these devices are improving the class of living and also is replacing the other electronics. Wearable devices are the new trend and they are here to stay intersecting this computing technology with health and sports market, it promises to change our way of living. This paper reviews the landscape of wearable technology focusing on its potential growth, exploring its next frontier and its offering to the fitness industry.

1. INTRODUCTION

1.1 The swift change in trend from Computers to Laptops, moving from Laptops to Mobile devices. Here comes a new era of technology, the wearable devices are taking people by surprise. There is nothing which these devices cannot do, from acting as your fitness trainer to acting as an infotainment for the user. The synchronization of the wearable device with a Smartphone is what makes it worth every penny you spend.

The wearable electronics are devices which are worn on a certain body part by the humans. These consist of a progressive circuit within the device and the wireless connectivity that makes it work enhancing user's experience. ^[1] In addition to this, the device must have the capability to perform various processes without the need of any other supplement device. These devices target a unique solution to the needs of the specific group of customers with credibility and innovation. The wearable devices which can be seen in market now days include the Smart watch, Google's eye glass, contact lenses these wearable devices have an extensive range of scope in terms of applications they perform.

1.1.1 Fitness

The new range of wearable coming to the market act as your personal trainer as well as a motivator. They keep you updated about your goals so that you finish them up on time. They measure your heart rate using sensors, inform you when you need to speed up and when you need to slow down. ^[5]

1.1.2 Healthcare

These set of wearable have been in market for a long time now. Used to measure blood pressure, blood sugar level, defibrillators and hearing aids as well. It is quite fascinating to know that special type of contact lenses have been developed that measures the blood sugar level of a person's body with the help of tears in eyes.

1.1.3 Infotainment

These wearable's act as a source of information for you. For example Bluetooth is used for wireless reception of calls. Smart-watches act as a source of information. It provides you about the new messages received on your mobile device and incoming calls as well. The smart-watches when synchronized with your smartphone gives you the breaking news right to you.

1.1.4 Industrial and Military.

It is quite interesting to realize that such devices hold significance for industries as well as for military purposes. In industries head up gear are used for display in production lines while in logistics hand worn terminals are used to track locations of the product.

In military and armed forces HUD's are used to improve the location and provide situational awareness.

2. DISCUSSIONS

2.1 Google Glass

One of the ever hyped device in market was the invention made by Google, the Google glass. This is a device worn on head. The device is just like wearing glasses and projects a translucent screen right in front of the eyes of the user. The

Google glass is just like augmented reality. These glasses can be used to perform various purposes like watch a video or a movie, informing about you of your mails or missed calls on your mobile device and you can have your road maps right in front of your eyes.

2.2 Smart-watches

The wide range of watches have been in market already. Smart-watches are something creating a buzz amongst users for its various aspects. The synchronization between your mobile device and your watch lets you perform various functions like text messaging directly from you watch, you can use your Google maps on it. It lets you access your call and phone log with a function of rejecting the call or keeping it on silent. In addition to this, the innovation of camera on watches now lets you click photographs and take videos. In future, you will be able to make video calls right from your watch.

2.3 Life-band/ Health band

The health bands are very much trending in market now with the necessity to keep oneself fit. These devices act as a personal trainer and a motivator. It is pretty much fascinating to know that researchers in United States of America have designed a health band that gives you mild shocks on your wrist when you don't complete your goals for the day. The Health bands are used to track your heart rate using sensors, it has a pedometer and informs you about your speed. The health bands also lets you know the amount of calories you have burnt during the rigorous work out period.

2.4 Mobilorm

This is what the future is going to be. As the name suggests, lorm depicting a system of identification that is used to create various sign and symbols using your hands. The Mobilorm is currently in trial period under the Intel hood, making use of the chipset being provided by Intel. This is a new method of communication being devised for those who suffer from visual impair ability or those who are handicap. The device will make use of gestures being set up on Mobilorm which can be used to communicate by people. Though significantly relevant, it entirely depends on people to accept it or now.^[6]

2.5 Wristband

Security and Authentication are one of the most sensitive issues that create a buzz. A wrist band with two sensors, one at the top while another one placed at the bottom is used to confirm your identity. It is done when you place your finger at the top of the sensor whereas the bottom sensor is already in contact. This completes the circuit and authenticates your identity granting you the access to your gadget. This technology will further be used to prove your identity for

making use of your automobile. Some major transformations like storing more than one identity can boost this product.

2.6 LumoBack

This device keeps you in shape, and not let you disturb your posture. Well, this one is especially for those who slouch a lot and wants to leave this habit. This wearable device is worn on your waist, whenever you slouch it gives you mild vibrations to make you realize that you are not sitting or standing in a correct posture. If that's not all, you can synchronize your device with a smartphone and it assesses your daily activities like pedometer, how long you sit and the number of calories you burn in entire day.

2.7 Smart Cap

Industries do require various wearable devices as well. The introduction of the smart cap is one of the most innovative measure taken to ensure safety and health of the individual working. This is a device worn on head which is used to measure the amount of fatigue a person is suffering from. The cap is powered by a smart EEG sensor which picks up electrical signal from the brain, these signals are then processed to determine the drowsiness level of the person using EdenSafe Universal Fatigue algorithm. This device is wirelessly connected to a small display that makes you aware when the person is feeling extremely fatigued and needs rest. This is an extremely innovative wearable which can be exclusively used for truck drivers as well as production workers.

2.8 4D Force

The 4D Force is a wearable technology that works on electrical signal. These electrical signals are actually brain waves which are being transformed into electrical signal. This device is specifically designed for Gaming purpose as well as medical purposes. With the help of this technology the player can control the game using his brain waves. To be precise, you can control the game using your thoughts. The 4D Force can convert various EEG and EMG signals to electrical signal, which can further be used to analyze your medical health and recommend any changes which you need to make in your lifestyle to improve your health.

3. WORKING AND PERFORMANCE SPECIFICATIONS

3.1 Wearable Devices are 'smart' devices which look like a normal device but has enhanced processing capability which links the devices to the body of the user and produces digital information. They give us access and control to change the configuration and provide relevant output to help us make better decisions. The only feature that differentiate them from the normal electronic devices is its hands-free benefit which help in communicating in any situation.

3.2 The basic components that a wearable device consists of are sensors, display and the processing or the computing technology. The sensors which are embedded in the device which share the data and give a context sensitive, computer boosted alert signal to the user.

3.3 Mostly the use of wearable devices is experimental and is still gaining a position in the market. A study at Northeastern University uses wearables to monitor the movements and physiological states of individuals with autism whose data make it better for the people around them to understand those who have difficulty in communicating in stressful situations.^[2]

4. SCOPE AND FUTURE PROSPECTIVE

With the growth in the sensors and microelectronics many companies like Google, LG, Xiaomi, and Nissan have started investing in this new project. The recent launch of Samsung smart watch and Google Glass wearables devices will soon makes its place one step further in the near future. Wearable smart brands are set for 350% rise by the end of 2014.

4.1 According to a report by Transparency market research, the Healthcare and Medical segment accounts the largest revenue share of about 35.1% in 2012. The report cites that major reasons for this include the rise in aging population and an increase in people with diabetes.^[3]

4.2 The growing need in the health sector and its benefits of and the services of a clinical setting wearable will occupy the major portion of mobile-health sector soon. It is predicted that by 2017 wearable will grow to nearly 170 million with Google leading because of its early devices launch.

The market of these devices at present is limited to wealthy consumers which might expand with the entry of new competitors and with the decrease in prices. The incidental change in purchase can also be like the trend of mobile phones and later there was an increase due to innovations. The market still remains volatile for them and is yet to make a take off in India in terms of price and needs of the users.

5. PROBLEMS AND THREATS

5.1 The main challenge faced by this technology is to sort the data collected in an efficient manner. Otherwise it can make

the process cumbersome thus creating confusion and increasing mistakes.^[4] Upgrading the network and its security is also a threat to this technology. The need to pair the device with another device like a laptop or Smart phones might lead to its overloading and slowing down the performance rate. Its feature of extracting data, recording and photographing of documents also poses a question on the privacy of its users. The solution to this is to state a privacy policy for sharing of information and connecting to the network.

6. CONCLUSION

Wearable technology is a rapidly maturing and useful environment of delivering the services with the hands free technology is creating a flexible platform for the growing world. With a unique technology and cutting edge competition in the future it is likely to make a significant transformation in the health, fitness and various fields and development in interface will make a significant in the wireless electronics category.

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