

EMERGING BLUETOOTH DEVICES

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Abstract: As wireless technology has made life much easier. Appcessories has contributed to the sudden emergence of the multiple wireless devices. Bluetooth being one of the wireless communication technologies has been a boon to the app store which provide a varied list of apps that support wireless devices that help an individual to keep track of events on a day to day measure, by just installing an app on their phone. Can life become any easier, well you can never say the evolution of technology can cease. This article describes those apps that run on mobile phones by establishing a Bluetooth connection to the Bluetooth wireless devices. The most commonly used devices are Bluetooth speakers and headphones, but here are some more devices that can keep you awestruck by its functionalities.

Keyword: Ad-hoc, Piconet, wireless communication-note, Wireless Display, Bluetooth, Appcessories

I. INTRODUCTION

Isn't it a complicated issue to manage wires? At some point in life all of us have hooked up a computer and its peripherals, or a DVD to a digital television or the telephone extensions throughout the house. What could replace these wires and cables and make it easier to manage electronic devices, the answer is Bluetooth. Wireless communication has been a boon in improvising technology and Bluetooth has rendered a lot in the field of wireless communication. Radio and television have the capacity to receive programs broadcasted in radio waves hundreds of km/miles away. Cordless phones use similar technologies to route calls from the base station to a handset. Even in case of Wi-Fi your computer has the capability to receive and send stream of internet data to the router which is directly connected to the net. These technologies discussed involve carrying information to and fro not through copper cables but through radio waves wirelessly [1].

In Bluetooth, the same radio wave technology is used, but the proximity in which it is used is about 10m or 30 ft. A few applications of Bluetooth are that it can be used to download photos from a digital camera to a pc, to connect a wireless mouse to a laptop or to connect a hands-free Bluetooth to your cellphone so you can talk and drive safely. The Bluetooth enabled devices have built in radio antennas that can simultaneously receive and send wireless signals to other Bluetooth devices. Those gadgets that do not support Bluetooth can be made Bluetooth enabled by using plug in adapters that are like usb sticks. The power of the transmitter decides the range over which a Bluetooth enabled device can function. The Bluetooth devices can be categorized into three classes.

Class 1: They are the most powerful type and can operate up to 100m (330ft).

Class 2: They are the most common and can operate up to 10 m (33ft).

Class 3: They are least powerful and don't go over 1m (3.3ft).

II. WORKING OF BLUETOOTH

The communication in Bluetooth is done by radio waves that are present in a band of 79 different frequencies that is centered on 2,45ghz. Bluetooth enabled devices detect and connect to one and other automatically and the maximum number of devices that can be connected to it is eight. There are no interferences with one and another because every pair of devices use one of the 79 available channels [2] [3]. If the connection must be established between two devices then they select a channel randomly, and if the channel is already being engaged, it randomly switches to another channel this technique is called as spread spectrum frequency hopping. To avoid any kind of interference from other electrical appliances, the pairs of devices should constantly shift the frequencies they would be using at least a thousand times in a second.

When two or more Bluetooth devices share information together, they establish an ad-hoc computer network called piconet. In a single piconet, one device can communicate simultaneously with up to seven other devices. A single device can be a part of many piconets simultaneously. The establishment of piconets is done dynamically and automatically, every Bluetooth device assigned to a piconet enters and leaves the radio proximity according to the piconets it is connected. The most common Bluetooth devices are of type class 2. The power required for this type is 1 mill watt- 1/1000th of watt and have a proximity of about 10m (33ft). The plug-in dongles for example the reliance dongle and MTS dongle that can be connected to the laptop, desktops are f type class 1. This type has a proximity that is like that of Wi-Fi which is 100m to 330 feet. One of the advantages of using Bluetooth is that it minimizes the

interference between your Bluetooth device and those in the vicinity. All the other devices that are on the existing piconet can join or leave at any time. One device is called the master of the entire network and is the overall controller of the network, when the other devices obey its instructions. Separate piconets can combine with another piconet and share information forming what's called scatter net?

Bluetooth smart technology in phones lead to Boom in Appcessory market:

It is not that common to find a mobile/smartphone that does not have the Bluetooth feature. The boon of hands-free calling, headsets, and wireless speakers encouraged the manufacturers to include it almost from the beginning. Apple was one among the first companies to being in the features of Bluetooth. The wide variety of compatible products provided all opportunities for companies to develop Bluetooth appcessories. As of now there are billions of Bluetooth products that work with our phones to gather information to make our lives more productive and better.

Phone apps create demand: The demand for phone apps that capture and process Bluetooth sensors has increased rapidly in the phone market. These apps are especially used in sports and fitness. For example, there are applications that collect workout information from wireless heart rate monitors and display it on a phone or PC or upload it on the web and let consumers share their results with friends.

Automotive or Cars: Bluetooth expands beyond hands-free calling. Bluetooth technology is being steadily growing in the automotive industry. Now Bluetooth enabled hands-free calling systems are equipped on millions of new cars and trucks. Keeping safety concerns in mind all the 12 words major car manufacturers now have made Bluetooth hands-free calling systems mandatory

Entertainment on the go: Bluetooth has not only had a spurring market in hands-free calling but it also has accounted for the infotainment in the car by connecting to the audio systems so that the drivers and passengers can listen to whatever they want to while driving. Nowadays smart phones not only allow the consumers to make calls or listen to music but is updated so well to perform various other activities. When connected to the audio (music) systems and the panel display, the drivers can make use of applications that help to navigate, check traffic, get information about the weather, also information on movies and resultants and other tasks to improve the driving experience.

Bluetooth enables new use cases in the car: The car manufacturer ford is exploring Bluetooth enabled systems that would keep Bluetooth enabled systems that would keep track of a person's vital signs while driving.

III. BLUETOOTH DEVICES:

There is a wide variety of Bluetooth devices available in the market.

Bluetooth is commonly used in

- Phones
- Cars Computers
- Television
- Headsets
- Gaming Consoles
- Tablets

Since Bluetooth has low energy functionality the variety of Bluetooth devices on the market is staggering. There are a few use cases that make one ponder what would happen if Bluetooth is enabled in the following devices.

a) Socks:



Bluetooth socks make for happy running feet. There are lot of devices that keep track of your fitness level. The sensoria sock by Heapsylons aims at safeguarding your feet from injury. The company states that exercising with the socks helps you to learn more about your body by informing you if you are running incorrectly so you can refrain from injuries.

The anklet and sensor socks work hand in hand to gather information that is updated through Bluetooth technology to a smart phone or computer. The gathered data is added to a dash board for analysis and coaching. The product can also help diabetic foot ulcer patients or warn elderly patients if they are losing balance to alert to alert the risk of falling. This socks is in the Indiegogo phase but soon we can expect it in the market.

b) Shoes:



Nike makes Bluetooth smart sensor cool and fun. Nike always comes up with new products that people notice. The company is drawing widespread media to advertise its newline of Nike + shoes with sensors embedded in the soles, which in all sorts of interesting new ways and update the data to a smartphone application. These shoes use the Bluetooth version 4.0.

They were launched on June 29th and they are the first shoes with Bluetooth smart sensors in them. The Bluetooth smart sensors in the shoes allows everyone from pro athletes to weekend warriors to get an insight about their work outs and information about their vertical leaps and hustle(quickness) and how many times they have jumped during a workout or a game. The information can be wirelessly sent to a Bluetooth hub device. In case of Nike + an iPhone and iPod touch is

used and this information can be shared with friends via the Nike + training application or through social media.

c) Ball:



The Bluetooth technology embedded within a ball gather data by tracking different performance parameters and updates the information in the application. This could help in analyzing and to increase performance.

d) Bluetooth technology to track water intake:



The interactive water tracking product would not require a third party to keep track with the water level. The aim of the company is to combat the mild dehydration everyone seems to suffer from. The device is attached to the bottom of the bottles and sends reminders to drink water and periodically keeps track of how much water is consumed. This information is sent via Bluetooth. Another technology is embedded into the application, this would chart the beverage consumption data. It also works with soft drinks like cola to keep track of the sugar intake and figures out the rising risk of diabetes [5].

e) Chew on This: Bluetooth mouth guard technology, Detects grinding



Not many of us are aware of tooth grinding that happens when we are asleep, which can cause headache, tooth damage and jaw pain. The only way on can find out, if they have this habit is to visit a sleep clinic overnight. But now there is an alternative, the new Bluetooth technology mouth guard checks if you are grinding your teeth at night and stops you from doing it. It is a device that is embedded with sensors that measure with how much force is your jaw exerting and which are the teeth that are being damaged. The device communicates this information to the application through Bluetooth and then this information can be used by your dentist to pick a right treatment. The researchers are trying to come up with a device that can detect body conditions such as over heating or concussions.

f) Now your Beanies do carry functionalities as well



There are lot of us out there who want to accessorize our outfit, well the Beanies can just give you the hipster look. But these Beanies usually are not earphones friendly. But now we have Bluetooth technology that is being equipped in the beanies to let us listen to music or take calls almost hands-free. It is designed in such a way that can be used for hours continuously with ta Bluetooth smart technology that won't drain your smart phone's battery or your beanies battery.

g) Bluetooth signs:



Signs everywhere are Bluetooth smart signs, Enote Wireless Display. It's a combination of a note, an electronic display and a beacon. It is an electronic post it., its functionality displays whatever information you want. It can be connected to any stationary gateway device or any mobile using Bluetooth technology. This E-note platform merges the visual world with the electronic world to tag things, people and as well as places.

h) Arms:



Skin deep Bluetooth technology turns your arm into a smartphone display. Introducing the circllet bracelet – it features Bluetooth technology, proximity sensors and a Pico projector with this your arm can turn into a smart interactive display. Imagine if you could just keep flicking your wrist to see and interact with your tablet or smartphone's screen on your forearm. The circllet bracelet is still yet to be launched but a prototype is already being tested it resembles a fitness band that can be worn on the wrist. This band that has capabilities to communicate with a tablet or a smart phone using low energy Bluetooth technology. TO activate the band you just have to flick across your wrist and immediately the Pico projector projects a screen on the users' forearm[6]. Eight long-range proximity sensors are embedded in the band that captures the user's finger movements on the projected

screen, and the band sends the information back to the tablet using Bluetooth

The bracelet is capable to work in varied conditions outside in broad daylight, under water and on any skin tone.

i) Pacifiers:



A UK based company, Blue Masters came up with a Bluetooth smart technology that helps you manage your newborn. It's called the Pacifi, it monitors a baby's temperature and transmits the data via Bluetooth technology to an application on the parent's phone. Pacifi also has a built-on proximity that allows the parents to monitor where exactly their child is and alerts them when the kid goes out of the proximity boundary or when the child loses or hides the pacifier.

IV. CONCLUSION

With Bluetooth in our lives it's easy to bring with it the promise of freedom from the cables and simplicity and freedom from the cables in networking that has not yet been reached by LAN (Local Area Network). In the current marketplace, of wireless and handheld devices, the mightiest competitor to Bluetooth is infrared. Infrared holds many key features, although it has a few drawbacks such as the line of sight it provides doesn't go through walls or through obstacles like that of the Bluetooth technology. Bluetooth isn't a line of sight and it provides ranges of up to 100 meters which makes it better than infrared. Bluetooth requires only low power and low processing with an overhead protocol. Due to which Bluetooth is considered ideal for integration into small battery powered devices. To conclude, the applications with Bluetooth are virtually endless.

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