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Wearable Technology-Objects and their Connectivity

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Abstract—*Wearable Technology is a fast evolving technology which deals with humans being or explored in a manner that they can be connected within a network with other human beings or objects. It is a part of "Internet of Things" which is a useful technology for a smart environment.*
Internet of things deals with the network of physical object or thing embedded with electronics, softwares, sensors and network connectivity which enables these objects to collect and exchange data. The Internet of Things allows object to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer based system. The advantages and capabilities of IoT are endless.

1. INTRODUCTION

Wearable Technology is a technology which is a necessity of a smart environment. It includes some objects which a human can wear to connect with the network. These objects may be some accessories like a wrist watch, a wrist band, a pair of shoes, or a belt. These objects connect a human to a network and having all the features of a microcomputer.

These objects will be consisting of hardware embedded into them, software installed on them and a network through which they must be connected. These objects will have their own identity on the network which itself will be unique, which will help them to interact with other objects into the network.

Example- a smart wrist band launched by Jawbone – Jawbone UP3. It is a wearable wrist band that has state of the art senses built into it to track your health on the go. It has built-in heart health sensors that can measure and track your resting heart rate while you are working or at home relaxing. It can automatically sync data of your work outs onto your phone to keep track of your daily and weekly workout routine.

2. ARCHITECTURE

The architecture of Wearable Tech can be defined in different layers for understanding and explanation modelled in (fig.1 & fig.2).

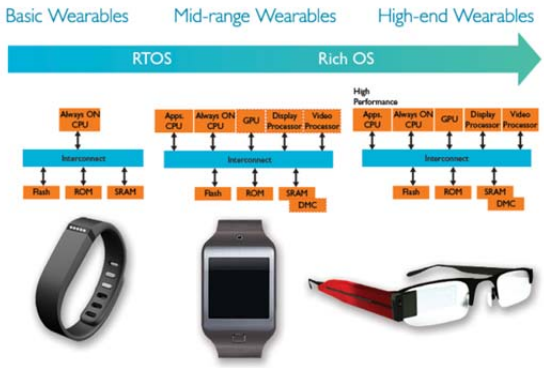

Fig. 1

- Hardware Layer
- Software Layer
- Connecting Environment layer (Outer Layer)

- **Hardware Layer :** This layer consist of physical objects and the circuits embedded into them. The objects consisting of a micro-controller which is programmed to function according to the need, memory devices which will be a combination of a RAM and a ROM to sync the recorded data, a power source, a connectivity adapter to catch and transmit data via signals within the network.
- **Software Layer :** This layer can be defined as the set of programs which are embedded into the micro-controller. The micro-controller can be programmed as per the desired output and need. This softwares consisting of a System Software and some Application Softwares. RTOS (Real Time Operating System) is the OS that comes under System Software. While some Applications are required to provide interface and operate the objects properly.

- **Connecting Environment Layer (Outer Layer) :** Several objects with their particular Hardware and Software layer are connected within a network forming an Environment refer (fig.3). These Environment or layer can be named as the Connecting Environment Layer. This layer is the outermost layer of the Architecture of Wearable Tech. This layer has the IP addresses of every particular object which help them to interact with each other within that network.

Outer Layer

3. ARRANGEMENT

All the above listed layers should be arranged in such a way that they produce the required output for which they have been installed. The functioning should be proper and the data analysed should be synchronised in personal data storage of the user.

Basically these devices interact with each other by their unique addresses which are provided to them within a network and a user identifies them by that address.

4. MANAGEMENT

Dealing with Wearable Technology two major things should be provided in a managed way :

1. Accuracy in data
2. Security with the data- Privacy Control

Accuracy in such a way that the data analysed should be correct and the wearables should function properly.Security in a such a way that the data which is analysed should be synchronised in the private data storage of the user only and should not be visible or accessible by others.

Following aspects should also be managed properly for a stable connection within the wearables and for high data accuracy :

- Devices must be fast. The speed of the devices must be at-least such that it respond and acknowledges synchronously with other wearables.
- It must consume less electric power for it to be more energy efficient and also for being more compact.
- The programs must retain less memory in the ROM of the wearables.

Connecting environment:

Wifi : the wearables consist of integrated circuits which have their unique address or simply we can say ip address.these ip address helps them to interact with each other . a device having an ip address can only interact when they are connected in a network or wifi.

Wifi helps to control and coordinate these wearable and perform the main function of making these wearables a smart device .Wifi helps the wearables to sync the data which is analysed by them to get stored on the users private data storage device, shown in (fig.4).

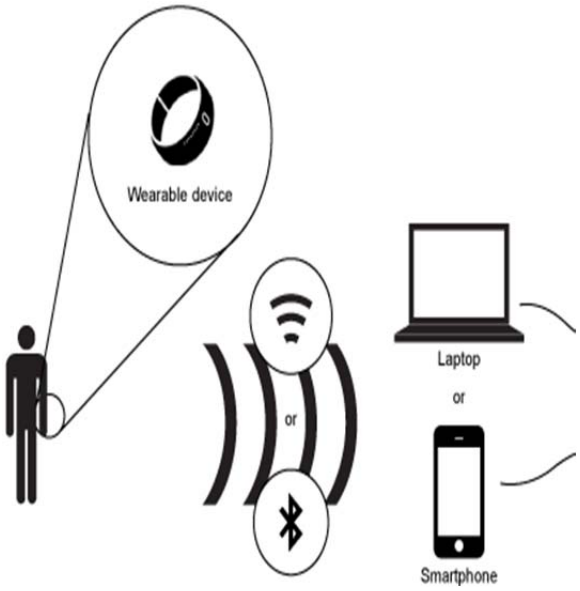

Fig. 4

Bluetooth: Bluetooth can also be used to control and manage the wearables .bluetooth signal can be used to interact with the wearables but the the circuit in the wearables should be integrated with the Bluetooth module which helps the user remote device to control the and interact with the wearables .

5. FUTURE SCOPE

- These wearables should have a large power backup such that the communication link should last longer.
- The connecting environment should have alternative other than wifi and Bluetooth.it can be done using some programs or signal emitting hardware.

6. CONCLUSION

Wearable technology is a vast idea to explore in future. For any city to be a smart city, it should have an exposure to technologies using internet of things. Also it is the beginning of life towards smart living.

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