A Discussion on Wearable Devices and the Threats They Hold a Potential of Posing

Karishma Garikapalli[1], Vamsi Krishna Kalakuntla[2]

1,2Student of Malla Reddy Engineering College (Autonomous), Telangana, India

ABSTRACT

In this paper, we provide an insight into the extent to which wearable technology has reached in our lives. Also, we talk about, how much-untapped potential exists in wearable technology. Then we talk about how this growing interaction with wearables become a vulnerability and how dangerous can this vulnerability turn out to be. We point out in directions at which horizons of wearables can expand in near future. And finally, we open a discussion for the need of security in wearable technology.

Keywords : Wearables, Wearable Technology, Sensors, Security Threats, Smartwatches, New Technology

I.   INTRODUCTION

The idea of wearable devices is to develop smart devices that can be worn. And that has paved a way for innovation in a whole new direction.

For the first ever a time in the year 2004 Apple Inc. has revolutionized the entire domain of wearable technology with its iWatch launch and since that day meaning of the technology changed forever. Smart glasses are another turn around point in the history of wearable technology.

Wearable technology has evolved to an extent that it is being used to developwearable devices for almost each and every human body part. Wearable technology has evolved from the day it was born, from a luxury to a commodity to finally a necessity, this necessity has become so basic that it's been customized into a fashionable good.

Let's just say, wearable technology has become your own personalized assistant. The extent of what it can do is beyond belief in itself. The applications are vast, the major advantage of it being its tendency to remain worn. Wearable technology employees a variety of sensors to take in anything it can from human body observations. They track your activities, health conditions and other connected smart devices. These applications are more like the front end; the things we see.

Have you ever wondered if the wearable devices actually know more than they let on? As a matter of fact, they do. These sensors gather information on very intimate details of human functioning, they collect pulse, body temperature, precipitation,and even postures sometimes. A human being can be studied in more ways than one using these details. Apart from what the sensors collect, we also give these devices the access to connect to other personalized smart devices. Some devices also have access to personal bank details.

Having this kind of sensitive information under one roof unprotected can leave a person highly exposed and vulnerable. Imagine somebody having that kind of hold over you. Now the question is, how safe are you? What can you do about it? Let's get some answers.

II. THE REACH OF WEARABLE TECHNOLOGY

Let's start with step 0.

The first thing that comes to anyone's mind when they talk about wearable technology is a watch, a smart one at that. There is a lot of market for smartwatches, hence the variety. A lot of multinational firms launch a lot of smartwatches each year with a varied set of functionalities. From a simple physical activity tracker to providing your entire smartphone on your wrist. Smartwatches cover for a lot of devices with expanding horizons. It evolved so much that you can actually make bank transactions with the flick of your wrist. They also track your health, so much so, that they might as well be your personal doctor. They bring your phone into arm's reach (quite literally).

Now let's step it up a bit.

Ever heard of the word sweat sensors? These are small wearable sensors that detect glucose, lactate, sodium, and potassium and body temperature. These are flexible plastic patches that are joined to a flexible printed plastic sensor array, which can be worn as wristbands or headbands. Labs have been thriving in developing sensors for sweat – the final product of the body's biological processes (the lactic acid that builds up after exercise). When these sensors come into contact with sweat they generate electrical signals that are amplified, filtered and calibrated using skin temperature. This technology feeds off your sweat (again quite literally).

Now it's show time.

Imagine connecting the physical and digital world without the limitation of a hardware device. Sounds impossible? Not so much. This was made a reality with the introduction of sixth sense technology. Sixth sense technology was born of a man who implemented a wearable computer inform of neck-projector connected with a camera back in 1990. That paved a path for many thriving young research scientists that came up with newer faster and better applications. The basic idea behind this is detecting movement of wrist, fingers and hand gestures, and convert them into an electronic input that triggers the expected results. The most common applications include mapping, reading newspapers, and checking time by drawing a circle on the wrist, snapping pictures by simple gestures etc. Other than being portable, this device also serves as a computer and saves time spent on searching for information.

In time Google has stepped up this game, with the launch of google glass. The google glass is basically an eyeglass that will project anything and everything Google can, onto the lenses. This has combined features of Augmented Reality and Virtual Reality. As you turn your head you'll get information about your surroundings and nearby objects from Google Goggles, info on buildings and establishments from Google Maps, even your friends' nearby check-ins from Latitude. Google glasses are basically wearable computers that use the evolving familiar technologies that brings the sophistication, ease of communication, information access for the physically challenged class of people.

III. VULNERABILITIES

Into the kind of generation we are evolving, the word personal space has a whole new meaning. If we were to know that someone or something can keep an eye on every move you make, every step you plan and almost every little thing you do as basic as breathing, without being barely noticeable. And if this makes you uncomfortable, now imagine somebody actually analyzing all these observations.

Creepy right? If this is creepy, imagine that kind of analysis done by a wrong person.

Desktop and laptops can be hacked and exploited for information-and so can wearables. Wearables are used not only to track information but also help in instances of litigation through computer forensic and e-discovery situations in an ongoing process.

Wearable devices are a part of IOT, which means they arealways connected through Bluetooth or internet, etc. Data stored in these devices are sensitive, this is vulnerable mainly because there is no encryption on the stored data, usage cannot be monitored, they are closely tied to other devices, their internal security ranges between simple to non-existent. The security and privacy are solely dependent on the producing firm, who is responsible for authentication.

We all know that nowadays the payment is cashless everywhere. The one who is wearing a wearable device like KERV ring, the credit card,and bank details are synced with that KERV ring and we can make the payment just by putting the KERV ring near an NFC reader. The main problem with this type of scenario is Eavesdropping, it refers to criminal listening to the NFC transaction. NFC payments use magnetic coupling to manage the energy transference between the HF RFID reader and tag antennas. The coupling places limits on how far signals can reach, still known to be vulnerable as far away as five meters. Ultimately, if an interceptor can receive, amplify, process and decode the leaked signals, they can eavesdrop.

As much as a breakthrough, google glass is, it stillis claimed that the control of the device using QR codes could be compromised. It is discovered that the device is able to produce its own malicious QR codes which force Glass to connect silently to a hostile Wi-Fi access point. That access point, in turn, allowed the researchers to spy on the connections Glass made, from web requests to images uploaded to the cloud.

Wearables are as reliable as a person looking over your shoulder for you, the moment that said person turns shady, you become as vulnerable as you were safe.

IV. FUTURE SCOPE

4.1 DuoSkin

MIT media lab in collaboration with Microsoftresearch has put together a fabrication process that helps prototyping functional devices directly on users' skin using a gold leaf as key material, a material that is cheap, robust and skin friendly for everyday wear. They demonstrate three types of on-skin interfaces: sensing touch input, displaying output and wireless communication. The aesthetic customization of DuoSkin resembles metallic jewelryand temporary tattoos found on-body decoration making the exposed interface a fashion statement.

It paves a path for the demystification of on-screen electronics, instead, they will converge towards user-friendliness, extensibility, forming a DuoSkin integrating to the extent that it has seemingly disappeared.

4.2 Pilot

TheWaverly labs took a step towards eliminating language barriers through technology. The company's first product- the pilot translating earpiece. The pilot looks like a fairly standard pair of wireless earbuds. They fit snugly in your ear canals and can be used to play music from your phone.

It is claimed thatthe pilot can also translate languages in real time, enabling a conversation between two people who speak different languages.

The pilot buds can be worn like any other pair of Bluetooth earbuds. It can be used to listen to music, make phone calls or get audio notifications.

4.3 GSR Pro Sensor

It's a wristband in development, which is not yet on the market. This wristband measures stress levels and dictate the quality of sleep you're getting. It detects the changes in your skin conductance and sends that information via Bluetooth to an app in order to relate to standard analyzed information. This prototype is still under consideration and has the potential to exceed the expectations of customization, and reach the level of personalization in digital assistance.

4.4 CTRL XC

TheCTRLXC is the world's most advanced and fastest tint changing sunglasses. Most sunglasses do not adapt to changing the light. Other photochromic lenses adapt very slowly and are not controllable. The patented electronic Tint-on-Demand liquid crystal technology is ultra-fast and controllable. This is why it is being developed for the U.S. Army to be their next generation standard issue eyewear. From navigating rough terrain in the mountains to cruising in between levels of brightness on country roads, the XC is the one-stop eyewear solution.

V. CONCLUSION

Wearabledevices are the future amenity. The wirelessness of it is its biggest potential, into which we are tapping. The explored horizons of wearable technology are huge, with an even bigger unexplored horizon. This evolution has brought about a tremendous increase in the available data of which a small portion is being utilized. The utilized portion is itself an extensively analyzed dataset which makes the untapped data a vulnerability. Each producer has their own way of dealing with this vulnerability. The real question is,is it enough?

VI. REFERENCES

[1]. https://en.wikipedia.org/wiki/Wearable_techn ology

[2]. https://online.grace.edu/news/business/the-past-present-future-of-wearable-technology/

[3]. https://www.csoonline.com/article/3054584/se curity/7-potential-security-concerns-for-wearables.html

[4]. https://www.eidebailly.com/insights/articles/2 018/4/security-risks-wearable-devices

[5]. https://youtu.be/yeY61S3uYpo

[6]. https://www.nature.com/news/wearable-sweat-sensor-paves-way-for-real-time-analysis-of-body-chemistry-1.19254

[7]. https://youtu.be/kTUGkKQ2vGc

[8]. 2016 24th International Conference on Software, Telecommunications and Computer Networks (SoftCOM) INSPEC Accession Number: 16522452

[9]. https://internetofthingsagenda.techtarget.com/ definition/Google-Glass

[10]. https://support.kerv.com/information/

[11]. https://www.kickstarter.com/projects/ctrl-xc/the-fastest-lcd-tint-changing-sunglasses-ctrl-xc

[12]. https://www.waverlylabs.com/

[13]. https://www.google.co.in/url?sa=t&source=we b&rct=j&url=https://designtoimprovelife.dk/pi lot-translating-earpiece/&ved=2ahUKEwilo5WL-s3dAhUNfysKHSD9AGQQFjAeegQIBBAB&us g=AOvVaw1mxNR2LY68rFtRwa8X3uZi