IJAS

Characteristics Features And Market Analysis Of Smart Wearables With Sensors

Dr.M.R.Srikrishnan

Assistant Professor (Senior Grade), Department of Fashion Technology, PSG College of Technology, Coimbatore

Abstract: Smart wearables are gaining more popularity and demand as far as consumer market is concerned. Defenitely smart wearables will rule the world. The way of manufacturing matters a lot. Technically the formation of circuits and integration of electrical circuits along with wires and chanellizing them or adorning them with fabric structure is a challenging factor. Proper working of those circuits have to be ensured. This is because the smart garments or wearables are helpful for humans through several ways. They are helful for us for carrying out our normal routine activities in daily life. They will be replacing the already existing normal apparels. Infact their replacement will be effective through their functional and smart performance which will not be available with normal apparels, garments and other technical textile products. In this paper I have dicussed about the characteristic features and also about the market analysis of smart wearables along with sensors.

Key words: Wearables, sensors, Sports, market etc.

1. INTRODUCTION

It is intimately connected with people's everyday lives, as anything functional to perform daily activities is actually "wearable". Furthermore, the recent worldwide spread of COVID-19 is forcing several healthcare providers thus creating the way to a more increased use of wearable devices and remote monitoring solutions in the medical field.

The integration of electronics into the fabric is the pivotal point of this technology. Moreover, wearable sensors are subjected to mechanical deformations which can seriously compromise their sensing capability. The complete integration of sensors in the fabric leads to a well-defined industrial manufacturing process.

Traffic Tracking Smart suit development:
Rising traffic levels and increasingly busier roads compel increasing requirement to develop intelligent traffic monitoring system which can play an important role in road traffic. This introduces the need for intelligent traffic surveillance systems that can provide real time traffic data.

The conductive fabric is selected based on the required conductivity. The conductive fabric development is done by weaving the combination of selected yarns. The conductive pen is chosen to develop circuit using conductive ink. The circuit is designed using illustrator and the design is traced using conductive pens on the conductive fabric. The sensor, LED displays are incorporated into the garment.

Features of Garments with integrated sensors

The system architecture includes both hardware and software items, and it is com- posed of several subunits: control, communication, location, power, storage, display, sensing, actuator and two supporting subsystems that are the interconnection and soft- ware.

The sensing and actuator units can be based on textile technologies connected to the electronic board

First, the Hexoskin t-shirt (Carré Technologies Inc., Montréal, Canada) provides a wearable health monitoring system measuring, for example, HR, maximal heart rate (HR_{max}), heart rate at rest, heart rate variability (HRV), heart rate recovery (HRR), RR, tidal volume, oxygen consumption, movement, step count, cadence, stride, activity level, burnt calories, and sleep quality.

Wireless body area sensor networks:

Arguably, the field of wireless body area sensor network (WBASN) was first introduced by Van Dam et al. in 2001. Even before that time, with the increasing popularity of portable devices in 1996. Initially, personal area network was the term used for these types of networks. The following figure illustrates an example scenario of such a system.
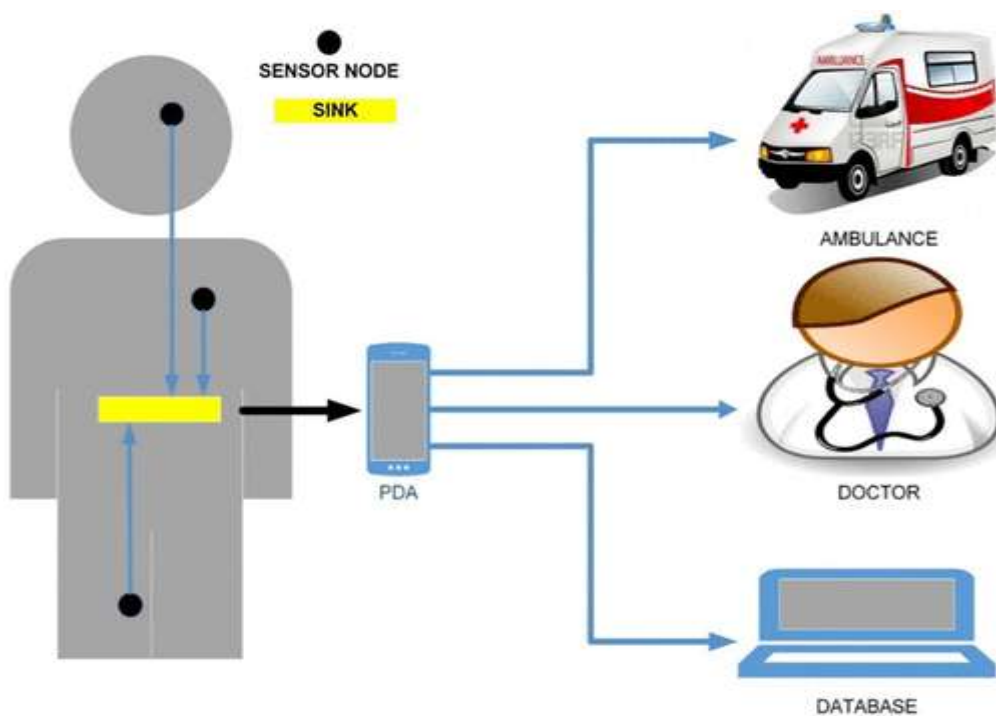

Figure 1. sensor network in healthcare.

Smart Garments in sports
. Smart garments are all set to supercharge the fashion industry in the years to come.

Figure 2: Smart shoe

Technology is an indispensable part of our life today. After the huge success of fitness wearables like Apple Watch, Fitbit, Polar fitness monitors, etc., etc., smartness and intelligence is progressively making inroads into the clothes we wear.

Smart Clothing Market analysis:
Much like the evolution of smart phones and tablets, Smart clothing, or e-textiles, have conductive fibers or sensors attached to or woven into the clothing material. Despite the rapid growth of wearable technology in fitness tracker and smart watch categories, other categories are lacking dramatic growth. In particular, smart clothing represents less than 1% of the global wearables market.

2. CONCLUSION

1. There are many smart clothing products which provides personal biometric or environmental data to end users for improving the health, safety, and happiness of consumers.

2. With the larger wearable industry and capability as well as a new market of IoT platforms, smart clothing is positioned to have the tools for market success.

3. REFERENCES:

[1] Alessandra Angelucci * , Matteo Cavicchioli , Ilaria A. Cintorrino, Giuseppe Lauricella, Chiara Rossi , Sara Strati and Andrea Aliverti, "Smart Textiles and Sensorized Garments for Physiological Monitoring: A Review of Available Solutions and Techniques", Sensors 2021, 21, 814. https://doi.org/10.3390/s21030814.

[2] Adans-Dester, C.P.; Bamberg, S.; Bertacchi, F.P.; Caulfield, B.; Chappie, K.; Demarchi, D.; Erb, M.K.; Estrada, J.; Fabara, E.E.; Freni, M.; et al. Can mHealth technology help mitigate the effects of the COVID-19 pandemic? IEEE Open J. Eng. Med. Biol. 2020, 1, 243–248.

[3] Angelucci, A.; Aliverti, A. Telemonitoring systems for respiratory patients: Technological aspects. Pulmonology 2020, 26, 221–232. [PubMed].

[4] Stoppa, M.; Chiolerio, A. Wearable electronics and smart textiles: A critical review. Sensors 2014, 14, 11957–11992.[PubMed]

[5] Andreoni, G.; Standoli, C.E.; Perego, P. Defining requirements and related methods for designing sensorized garments. Sensors 2016, 16, 769.

[6] Coyle, S.; Diamond, D. Medical applications of smart textiles. In Advances in Smart Medical Textiles; Elsevier: Amsterdam, The Netherlands, 2016; pp. 215–237.

[7] Cherenack, K.; Van Pieterson, L. Smart textiles: Challenges and opportunities. J. Appl. Phys. 2012, 112.

[8] Rambausek, L. Textronics: Definition, Development and Characterization of Fibrous Organic Field Effect Transistors 2014; Ghent University: Gent, Belgium, 2014.

[9] Gandolfo, P. Bluetooth Low Energy, Zigbee, and Cognitive 3D-ICs Add Muscle to Telehealth. Available online: https://www. eetimes.com/bluetooth-low-energy-zigbee-and-cognitive-3d-ics-add-muscle-to-telehealth/# (accessed on 20 December 2020).

[10] Rahat Ali khan, A.I Sakib khan pathan, "The state-of-the-art wireless body area sensor networks: A survey", International journal of distributed sensor networks", April 2018, SAGE publications, https://doi.org/10.1177%2F1550147718768994.

[11] Sayem, A.S.M.; Teay, S.H.; Shahariar, H.; Fink, P.L.; Albarbar, A. Review on smart electro-clothing systems (SeCSs). Sensors 2020, 20, 587.

[12] Gerhardt, U.; Breitschwerdt, R.; Thomas, O. mHealth Engineering: A Technology Review. J. Inf. Technol. Theory Appl. 2018, 19, 5.

[13] Majumder, S.; Mondal, T.; Deen, M.J. Wearable sensors for remote health monitoring. Sensors 2017, 17, 130

[14] Van Dam, K, Pitchers, S, Barnard, M. Body area networks: Towards a wearable future. In: Proceedings of the wireless world research forum (WWRF) kick off meeting, Munich, 6–7 March 2001. WWRF, http://www.wwrf.ch/contact.html

[15] Zimmerman, TG . Personal area networks: near-field intrabody communication. IBM Syst J 1996; 35(34): 609–617.

[16] Kim, B-S, Kim, KH, Kim, K-I. A survey on mobility support in wireless body area networks. Sensors 2017; 17(4): 797.

[17] Salayma, M, Al-Dubai, A, Romdhani, I. Wireless body area network (WBAN): a survey on reliability, fault tolerance, and technologies coexistence. ACM Comput Surv 2017; 50(1): 331–338.

[18] Zou, S, Xu, Y, Wang, H. A survey on secure wireless body area networks. Secur Commun Netw 2017; 2017: 3721234.

[19] Rasheed, MB, Javaid, N, Imran, M. Delay and energy consumption analysis of priority guaranteed MAC protocol for wireless body area networks. Wire Netw 2017; 23(4): 1249–1266.

[20] "Wearable Device Market Shipments to Reach 560 Million Units Annually by 2021." Tractica. Online, 3 Mar. 2016.

[21] Ismail, M. N. B., Sayed Hussin, S. A. B. and Shukran, M. A. "Gesture Recognition Robot Via Kinect Sensor", IARS' International Research Journal. Vic. Australia, 6(1) 2016. doi: 10.51611/iars.irj.v6i1.2016.54