Smart Garment and Electronic Textiles

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Abstract **- The new trends in the smart textile developments are more need in the modern world and bring the more and new functionalities in the live space, smart fabrics or electronic textiles are mostly in the form of entertainment events and highway workers, in this current article we go to discuss about the various improvements on the electronic textiles up to date and this device assisted the important characteristics of smart textiles are their launder ability, stretching and flexing together with specific characteristics such as their aesthetics, dry cleaning, and comfort for fashion and wearables. A key driver for smart textiles research is the fact that both textile and electronics fabrication processes are capable of functionalizing large-area surfaces at very high speeds. In this article we review the history of smart textiles development.**

Index Terms **- Smart Textiles, Electronic Textiles, launder ability, stretching.**

INTRODUCTION

Performance enhancing and Aesthetic are the two different categories comes under smart textiles, the main purpose of this innovation is-smart textiles are playing a major role in military application, aerospace application, flexible suit for sports persons and many more things and also smarts textiles are play a major role in our environment now a days in our life style and also they are provide the added value to the wearer, Depends on the usage smart textiles are created and electronic components are attached in it. In recent times many countries are started research related to smart textiles and started developing the smart textile product.

Smart textiles are becoming more integrated with service ecosystems that go beyond the current horizontal textile value chain. This will extend the material and tangible properties of smart textiles to intangible properties from services, such as the ability to measure and store data and change the functionality of a material over time. It is thus becoming more urgent for textile developers and service providers to work closer together to develop these types of smart textile services. This opens up a vast field of opportunities for textile developers, product designers, and service designers to combine their disciplines to develop close-to-the-body applications in the area of well-being.

This is a highly focused special journal issue dedicated to novel SMART textiles which aims to promote this life-changing discipline by providing a platform for dissemination, networking, discussion, and debate. The sensing/adapting/responding, multi-functionality, low energy, small size and weight, ease of forming, and low-cost attributes of SMART Textiles and their multidisciplinary scope offer numerous end uses in medical, sports and fitness, military, fashion, automotive, aerospace, built environment, and energy industries. The quest for these new and high-value materials crosses scientific boundaries, redefines material science, design, and engineering, and finds new uses. As such, SMART textiles are particularly important to quality of life and in sustaining energy and our environment.

Smart textile sensors and systems, which continue to be utilized in an increasing number of areas (e.g., sports, medicine, gaming, military, and aerospace), represent an exciting and growing field of research. Though a range of STSs have been developed to monitor physiological and physical factors, there is a lack of measurement approaches in some areas. Notably acceleration and velocity measurements require other technologies such as micro-electromechanical systems. However, ongoing technological advances may make it possible to integrate accelerometers and inertial measurement units (IMUs) into the fabric either intrinsically or extrinsically in the future. For example, Lorussi et al. developed a wearable device (INTERACTION) using inertial, knitted piezoresistive sensors, and textile EMG electrodes in 2016. INTERACTION remains one of the most highly developed systems for integrating several textiles and IMU sensors into a

garment. In particular, their wearable device includes three parts (a shirt, a glove, and trousers) to detect activities of daily life including gait, grasping, balance, and upper and lower arms activities, and reaching activities. Another issue that must be addressed in future studies has to do with a reliable source of power; and, indeed, several researchers are working in this field toward the development textile-based energy harvesting materials. In a related way, since electronics and circuits are essential components of each measurement system, we need to be able to print those electronic features on the fabric. Although efforts are ongoing toward printing electronics on a flexible sheet, printing these elements on fabric represents an important goal for advancing the field. It must be noted, however, that while one study described the successful transfer of printed circuit boards to fabric, the researchers still needed to add external integrated circuits and other metal elements. Moreover, although the placement of wearable sensors in terms of usability has generally been well-studied, there is only one study specifically related to the usability of smart textiles. In their investigation, Mokhlespour and Nussbaum determined the best placement for wearable sensors on smart garment from the perspective of users, and then compared their findings with another type of wearable sensors. It should be noted, however, that they collected data from healthy participants only, thus heightening the importance of determining the usability parameters for smart textiles in terms of other populations (e.g., older adults or patients). In short, there is a growing need to perform different usability research studies involving smart textiles. In addition, some clinical applications for smart textiles require much greater scrutiny; for instance, there are currently a limited number of research studies and STS prototypes for measuring blood glucose, blood pressure, and body temperature. Another challenge pertains to the critical need to develop comprehensive STS standards for defining, categorizing, applying, using, and evaluating smart textiles and garments. Last, but not least, there are currently very few commercial STSs on the market today despite the fact that the market for smart textiles is growing globally. A recent estimate indicates that the global market for smart textiles will exceed $1.5 billion by the end of 2020.Therefore the interest in the potential for smart textiles is increasing rapidly, opening the door for both start-ups and well-established companies to develop and commercialize the smart textiles and smart garments.

In the end, by addressing the formidable challenges detailed herein, we may eventually have a fully textile-based system for measuring a broad range of physiological and kinetic health factors—both remotely and continuously—with greater efficiency. By bringing together scientists and engineers toward the goal of making smart textiles a mainstream technology, the result could very well be improved health outcomes through enhanced monitoring approaches

TEXTILE MATERIAL USED

- Optical fiber embedded fabrics.
- Multilayer composite yarn and textiles.
- Plasma treated clothing.
- Ceramic coated textiles.
- Conductive fibers.

ELECTRONIC DEVICE USED:

- Sensors.
- Transmitter and Receiver.
- Data processing.
- Actuators.
- Storage.
- Communication.

ADVANTAGE OF ELECTRONIC DEVICE:

- Accelerate processes and make them more accurate.
- Collect process and asset data in real time.
- Monitor processes and assets accurately, reliably, and continuously.
- Increase productivity and reduce total cost of ownership.
- Lower energy wastage.

DIS-ADVANTAGE OF ELECTRONIC DEVICE:

- Narrow or limited temperature range.
- Short or limited shelf life.
- Cross-sensitivity of other gases.
- The greater the exposure to the target gas, the shorter the life span.
- Resistance varies continuously (analog) in photo resistor and are rugged in nature.

CONCLUSION

The development of smart textiles reaches far beyond imagination and also smart textiles are the most exciting innovation in the field of textile engineering. These are all done for the development and advancement of new materials and better communication. Textiles are also changing day by day. The hybridization of textiles and electronics brought changes in the interactive textiles. The developing field of smart textiles could show a lot of new things in all its applications. It has importance for medicine and healthcare, protective clothing‘s, in the casual clothing‘s and lifesaving products.

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