For example, nonelectronic smart textiles might feature special threads or coatings that absorb moisture or make garments withstand more washing machine cycles. Electronic smart textiles typically include embedded sensors that may measure the wearer's bodily characteristics or environmental factors.

Some garments even change color after receiving a wearer's smartphone command.

There are also smart textiles that respond to external stimuli. Those include fabrics with shape-memory capabilities or those that can break down certain chemicals, demonstrating self-cleaning performance.

One of the main arguments for smart textiles is that they could reduce the need for bulky electronics.

A person may be more likely to track their exercise by wearing innovative athletic gear instead of a wrist gadget.

Here's a closer look at the exciting possibilities in smart textiles that could make them appealing purchases.

The invention of synthetic fabric Lycra in 1960 is considered as the most commonly used smart fabric due to its unprecedented elasticity in sports and fashion markets.This fabric with its combination with natural fibre is used for making swimwear, hosiery, surgical garments, interior furnishing, clothing which features of elasticity functionality and comfortable to wear

All smart materials consist of energy transfer from the stimuli to the response.

Smart materials are the integrated and the complex materials which have an ability of processing, analysing, and responding with an adaptation to the environment.

This material has the potentiality to change themselves depending on the temperature, pressure, density, or internal energy change.

The behaviour of smart material is governed by the amount of energy required and a degree of a specific change. If the material gets energy from the outer environment it tends to resist it or absorb it without changing on it

TYPES OF SMART TEXTILES

•Passive smart textiles: This is considered to be the first generation smart textile where materials can only sense the environmental conditions.

These only perceive the data about the conditions of the environment an act like a sensor which can be accessed by changing its colour shape thermal and electrical resistivity, like a garment with built-in thermistors can log the body temperature over time. Example of passive smart textiles is UV protective clothing, plasma-treated clothing, fabric with Optical Sensors.

•Active Smart textiles: These are considered to be the second generation of smart textile that have the property of both sensors and actuators. They can sense and respond to external conditions.

If the actuators are attached in the passive smart textiles it will become an active smart textile as it can respond to the particular stimulus.

Active smart fabrics are smart fabrics in real terms which features of regulating temperature, absorbing vapours, memorizing shape, resisting water, and having a chameleon effect.

•Ultra smart textiles: These are the third generation of smart textiles with much more advanced technology. These are material which can act like sensors receiving the stimuli from the environment, respond to the stimuli and can reshape themselves according to the external conditions.

These can make forecast and fit the external conditions along with sensing the data types.

They exhibit the functions of the brain owing to microcomputer attached with it.

Examples of ultra-smart textiles are spacesuits, sports jackets, musical jackets, wearable computers, etc.

•Types of smart clothing by items include shoes, scarf, dresses, jacket, shirt, insoles, bicycle helmets, etc.

Dr. F Nayeb Morad

Innovation in Textiles

Clothing is considered as one of the three basic human needs. From the prehistoric age, textiles are used for clothing then extended to household and domestic purpose with developing civilization.

The earlier textile was used in different forms such as tents, protective garments, ropes, etc. used for technical performance.

Textile is an article made by weaving threads or yarn into fabric.Initially, these were made of natural animal or plant-based fibres.

Later with improvement in technology synthetic fibres were designed in laboratories which feature versatility and were strong.

In this day and age, digital technologies have reached to the benchmark were extremely thin fibres that run through the smartphone and wired data can be woven into clothes textiles.

That's what a Smart Textiles really is

The word smart textiles were acquired from intelligent or smart materials.

The term smart materials were defined for the first time in Japan in 1989.

Smart Textiles can be defined as the textiles with an tability to sense the stimulus from the environment, react to them and can adapt themselves for the integration of functionalities in the textile structure.

Stimulus and response can have electrical, thermal, chemical, magnetic, or other origins.

Smart textiles are now unified with the service ecosystem that can go beyond the current scenario of the textile value chain.

Smart Textiles also have an ability to interact with wearer's body and to sense the wearer's physiology and respond

to his needs. Smart textile will soon have an intangible property from service with an ability to measure and store data and change the functionality over time.

These technologies have paved the path for an alliance between the textile developers and the service providers to work together and develop these types of smart textile services (STSs).Collaboration between the textile developers and service providers will offer a huge range of opportunities for the textile developers, product designers, and service designers

Smart Textiles:

Smart textiles encompass a broad category of innovations that address known problems or provide desired enhancements.

A recent research paper groups such products into electronic and nonelectronic types to highlight the potential diversity.