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IT'S NOT JUST ABOUT IDEAS IT'S ABOUT MAKING IDEAS HAPPEN TO DO IT !

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON, MAHARASHTRA

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E-textiles

LEDs and fiber optics as part of fashion

Electronic textiles, also known as smart garments, smart clothing, smart textiles, or smart fabrics, are fabrics that enable digital components such as a battery and a light (including small computers), and electronics to be embedded in them. Smart textiles are fabrics that have been developed with new technologies that provide added value to the wearer. Pails-Friedman of the Pratt Institute states that "what makes smart fabrics revolutionary is that they have the ability to do many things that traditional fabrics cannot, including communicate, transform, conduct energy and even grow"

Smart textiles can be broken into two different categories: aesthetic and performance enhancing. Aesthetic examples include fabrics that light up and fabrics that can change colour. Some of these fabrics gather energy from the environment by harnessing vibrations, sound or heat, reacting to these inputs.

A new report from Cientifica Research examines the markets for textile based wearable technologies, the companies producing them and the enabling technologies. The report identifies three distinct generations of textile wearable technologies:

1. "First generation" attach a sensor to apparel. This approach is currently taken by sportswear brands such as Adidas, Nike and Under Armor
2. "Second generation" products embed the sensor in the garment, as demonstrated by current products from Samsung, Alphabet, Ralph Lauren and Flex.
3. In "third generation" wearables, the garment is the sensor. A growing number of companies are creating pressure, strain and temperature sensors for this purpose.

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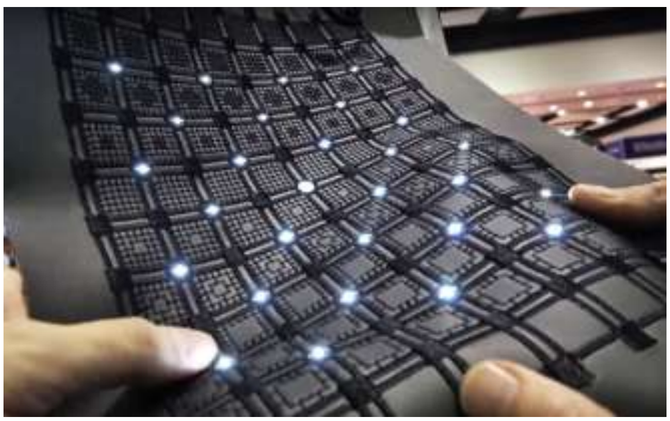
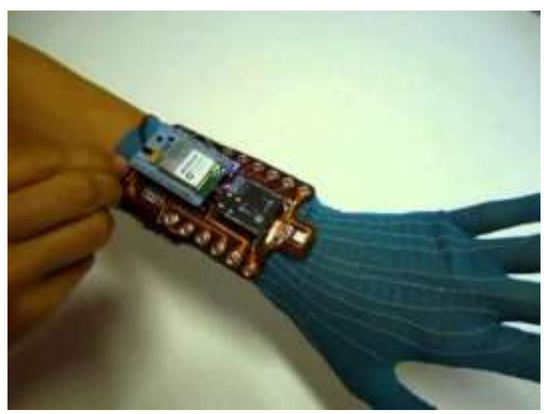
The color changing and lighting scheme can also work by embedding the fabric with electronics that can power it. Performance enhancing smart textiles are intended for use in athletic, extreme sports and military applications. These include fabrics designed to regulate body temperature, reduce wind resistance, and control muscle vibration – all of which may improve athletic performance. Other fabrics have been developed for protective clothing, to guard against extreme environmental hazards, such as radiation and the effects of space travel.



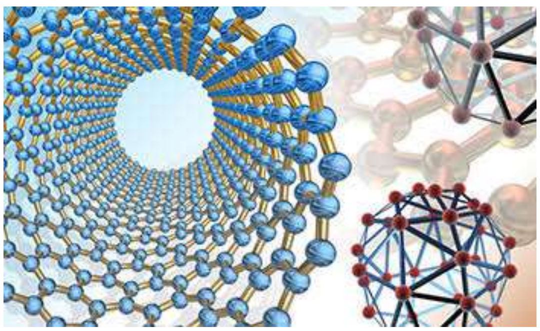


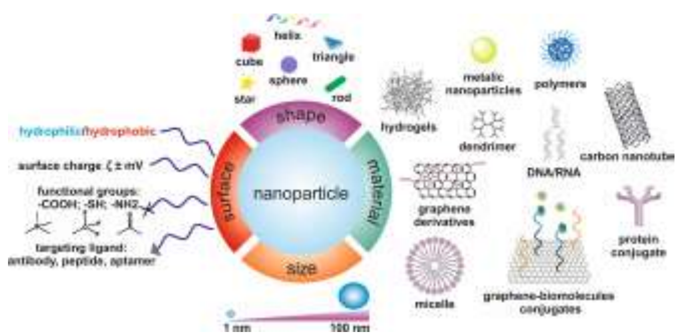
The health and beauty industry are also taking advantage of these innovations, which range from drug-releasing medical textiles, to fabric with moisturizer, perfume, and anti-aging properties. Many smart clothing, wearable technology, and wearable computing projects involve the use of e-textiles.

Nanomaterials

There are significant differences among agencies on the definition of a nanomaterial.

In ISO/TS 80004, nanomaterial is defined as the "material with any external dimension in the nanoscale or having internal structure or surface structure in the nanoscale", with nanoscale defined as the "length range approximately from 1 nm to 100 nm". This includes both nano-objects, which are discrete pieces of material, and nanostructured materials, which have internal or surface structure on the nanoscale; a nanomaterial may be a member of both these categories.





On 18 October 2011, the European Commission adopted the following definition of a nanomaterial: "A natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm – 100 nm. In specific cases and where warranted by concerns for the environment, health, safety or competitiveness the number size distribution threshold of 50% may be replaced by a threshold between 1% to 50%."

Video Friday: Misty Robotics Begins Shipping Its Programmable Personal Robot

Fiber-optic data rates on a single wavelength will take a big step up later this month. Acacia Communications says it will demonstrate a 1.2-terabit-per-second module at the European Conference on Optical Communications (ECOC) that is taking place from 22-26 September in Dublin. Transmission of up to 800 gigabits per second on a single wavelength was introduced for the first time this March at the Optical Fiber Communications Conference (OFC) in San Diego. Both meetings are cosponsored by IEEE.

The explosive growth of cloud computing and traffic between data centers has given network operators a tremendous thirst for bandwidth on scales including those for transmission inside data centers at the network edge and for submarine cable stretching more than 10,000 kilometers. Data centers have long relied on coherent optical transmission of 100-gigabit Ethernet signals on each of many separate wavelengths carried by an optical fiber

Now operators have begun shifting traffic at busy data centers to 400-Gigabit Ethernet. With cloud data centers now mirrored around the globe, operators also are pushing for ever-increasing capacities for transoceanic submarine cables, most recently the Pacific Light Cable capable of carrying 144 terabits per second between Hong Kong and Los Angeles.

The crucial elements of those transmission systems are modules that convert digital signals between electronic and optical forms.

THE MINDS OF THE NEW MACHINES

Machine learning has been around for decades, but the advent of big data and more powerful computers has increased its impact significantly — moving machine learning beyond pattern recognition and natural language processing into a broad array of scientific disciplines.

A subcategory of artificial intelligence, machine learning deals with the construction of algorithms that enable computers to learn from and react to data rather than following explicitly programmed instructions. “Machine-learning algorithms build a model based on inputs and then use that model to make other hypotheses, predictions, or decisions,” explained Irfan Essa, professor and associate dean in Georgia Tech’s College of Computing who also directs the Institute’s Center for Machine Learning.

Established in June 2016, the Center for Machine Learning is comprised of researchers from six colleges and 13 schools at Georgia Tech — a number that keeps growing.

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