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Smart Textiles Classification **module 3**

   Smart textiles are a specific textile structure that is categorized as mechanical, thermal, biological, chemical, and magnetic as well. They are intelligent textile structures or fabrics that can sense and react to environmental stimuli and they can be described as passive smart, active smart, and or very smart. Passive smart can only sense the environment and they are sensors, they provide the same function no matter what the environment is doing. Active smart textiles can sense the stimuli from the environment and also react to them ,besides their sensor function they also have an actuator function which is a device that uses power to convert a control signal into mechanical motion. Very smart textile is more advanced and is multi reactive, its hi-powered, they have a range of behaviors so their response is quicker (Kettley, 2016).A fun fact about how smart textiles came about for the first time was in 1989 in Japan.The first textile to be labeled smart was silk thread that had a memory effect , and Intelligent materials in textiles werent launched in the market until the late 1990s. To go more in-depth they are many examples of companies that used smart textiles for their projects and collections.

   The business Jacquard technology partnered up with Google, it is an experience that takes your daily activities to the next level by taking basic ordinary products that we wear, for example, an article of clothing. They wanted to make life easier by staying connected to the digital world and by doing this you can tap or swipe your shoulder strap or jacket sleeve to either skip a song or answer a phone call or simply take a picture without the hassle of touching your phone.(See image 1) It is a black small chip that you can put inside your article of clothing to access actions or alters you want your technology device to do such as a phone or technology from home. You can either double-tap, brush out, or cover, each action is a response to how you want you're mobile deceives to react. Fashion brands partnered up with jacquards such as Adidas and levis, Adidas came out with a shoe gaming technology by accessing and experiencing physical football and digital gaming, its a shoe insole (see image 2) that has a pocket space for the chip you can comfortably put inside of the sole while playing sports .You can pair with EA sports app that shows your miles distances, etc. Levis came out with a " trucker jacket" (see image 3) that enables you to play music and answers call right away from your sleeve with the chip, the chip will also give an alter or blink if your phone is missing. I will categorize this innovation as active smart because it is controlled by the consumer/wearer by a button (the chip) and the classic example of an active textile is sportswear as well and Adidas is one of the biggest sports companies out there so these designs in my option fall into active smart textiles.

    There is a smart machine that is called the cyclo knitter and it is an indoor bike that can knit scarfs in five minutes. It's a pedal powering knitting bike that can make you a scarf while you're

pedaling(see image 4). You are left with your one personal scarf at the end with a specific color fabric you can choose or that's available (Blazenhoff, 2018) . I classify the scarf as passive smart textile because its a regular scarf that keeps you warm under weather conditions and provides the same function which is to keep the wearer warm no matter what the environment is doing. I do believe this is a fun and innovative smart way to make an accessory garment that was never thought of before and seen in the streets, which is quite unique. Lastly an example of a very smart textile and active smart textile in my opinion, is the loomia's electronic jacket. This jacket heats up and its designed to scale e-textiles (Mcdowell, 2019). E-textiles have the same functionality similar to smart textiles but they are not the same, whereas they both can provide an accessible for easier advantage for users. Furthermore, e-textiles are fabrics that enable electronic components such as sensor batterie lights, microcontrollers to be embedded in them and the jacket Loomia H1is created with wool and is heated powered by a two-hour battery and washable by hand. Since it operates on its own and without the usage of physical touch within 2 hours max I categorize it as very smart and it reacts to a temperature stimuli as well, it is self-adapting with its battery embedding into the fabric of the jacket. The reason it can be categorized as active smart as well is because it's controlled/ powered by a battery that is electric.

   All of the designs and collaborations previously mentioned are categorized under the first generation because a sort of sensor technology is attached to the apparel and first generations are actually taken by major sportswear brands like Adidas. It is not your daily casual wear and it's actually ordinary clothing providing additional value to the user by virtue of innovative technologies (mikhailovsky, 2017). Smart technologies are becoming a dynamic innovation for the textile sector,smart textiles are promoting a strengthening position internationally and are also creating new job opportunities for poor people, smart textile is a new invention to spread knowledge, and opportunities, it is a natural carrier for technology and in the future. New advancements in manufacturing technology have the potential advantage of improving efficiency for manufacturers in the diversity of all shapes and sizes and it is said that the upcoming industrial revolution will be enabled by four primary technological advancements. The four technology advancements are more connectivity, more data, machine learning/artificial intelligence, human-machine interaction, and advanced engineering. A lot of fashion companies are invested and are starting up already, for example, footwear brand fitmyfoot uses their smartphone app to scan customers' feet to 3d print custom-made sandals, more specifically their insoles (Lindzon, 2021). Smart textiles / garments are going to be the future of fashion slowly but shortly since companies are investing in more tech savvy ways to producing their work. Textiles and clothing is a crucial part of our lives because without them we wouldn't have clothes to wear , people are now thinking of how to take textiles alot further because there has been a great desire for intelligent materials such as textiles that can be seamless mixed with technology. The market of the e textiles consumption is growing quit fast compared to traditional fabrics and is growing in developing nations,(Barrera, 2021) studies shown worldwide smart fabrics market

will grow from $943 million in 2015 and $5369 million in 2022 , the global innovative fabrics market is prospering and growing rapidly.

Image References

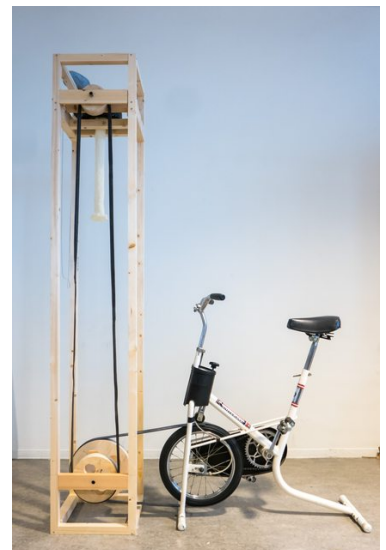Image 1 https://atap.google.com/jacquard/

Image 2

https://atap.google.com/jacquard/products/gmr/

Image 3 https://atap.google.com/jacquard/products/levi-trucker/

Image 4
https://boingboing.net/2018/06/14/this-indoor-bike-can-knit-a-sc.html

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