

Smart Textiles

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Us humans continue to make breakthroughs in our modern living by adding advancements to already functionally and desired areas that add extra value and benefit(s). An application that has been created to assist all who are around it that continues to show developments to the world today is technology. Being added to serviceable material such as textiles creates intelligent fabric that can sense and communicate from an interaction with the body or environment that conclusively supports the wearer's wellbeing in some case.

The simplest type of smart textiles is passive smart. They can sensor and/or monitor without user control and react independently (Kettley, 2016). Their role is fixed with no relation to the environment's state (Kettley, 2016). Information from stimuli such as chemical, mechanical, magnetic, electrical or thermal are transmitted to a processor (Kettley, 2016). An example of this category is the Adidas GMR insole. It connects physical sport activity to digital gaming when equipped to the smart insole and placed in virtually any shoe ("Jacquard by Google – Adidas", 2020). The innovation is a smart tag tiny computer powered by Google that seamlessly plugs into a product to translate one's interactions into commands ("Jacquard by Google – Technology", 2020). With the help of EA Sport's FIFA mobile app real-life performance is being synced and reflected in gaming skills ("Adidas GMR Tech", 2020). The collaborative design should be considered a passive textile because the smart tag must be affixed to the insole before functioning.

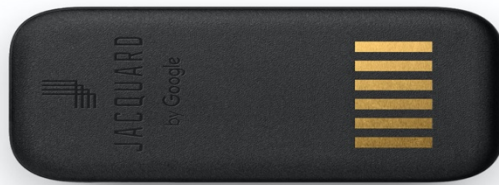


Figure 1. Jacquard's advanced compact tag (2020). Image URL:

<https://atap.google.com/jacquard/technology/>



Figure 2. Adidas's own Jacquard tag placed inside the insole (2020). Image URL:

<https://atap.google.com/jacquard/collaborations/gmr/>

The second level of smart fabrics is ready to engage. Active textiles can be reactive and interactive (Kettley, 2016). They work based on the results of sensed environment and move off the signal from a user's trigger (Kettley, 2016). The University of Central Florida's (UCF) College of Optics and Photonics (CREOL) developed color or pattern changing fabric that is done through a smartphone ("Active, user-controlled color-changing fabric", 2018). It is CREOL's ChroMorphous technology that incorporates the thread and sends electrical currents with special color pigments when temperature is raised on the fabric ("Active, user-controlled color-changing fabric", 2018). Textile fibers have been weaved with micro-wire inside each thread that through a thermochromic reaction change color (Stolyar, 2018). Through an app, the varieties can be controlled and customized at the user's discretion (Stolyar, 2018). This is an active smart textile because the changes are made due to the fabric that is implemented.



Figure 3. A bag made with Chromorphous technology (2018). Image URL:

<https://www.digitaltrends.com/mobile/chromorphous-color-changing-technology/>



Figure 4. A closer look at Chromorphous technical fabric (2018). Image URL:

<https://www.digitaltrends.com/mobile/chromorphous-color-changing-technology/>

Very smart is by far the most extremely intelligent type of textile. They are multireactive with a range of behaviors caused by self-adapting in dynamic environments (Kettley, 2016). Processors and other systems are implanted into the fabric (Kettley, 2016). Google proves to be a smart textile connoisseur collaborating with Levi's to create a smart denim jacket. With the small tag inside the sleeve, the sleeve itself resembles a touch pad (Hartmans, 2019). The Jacquard threads by Google are woven into interactive textiles that responds to touch

gestures “Jacquard by Google – Technology”, 2020). The area(s) of specialized yarn found on the garments can be activated to locate someone’s phone or control music (“Jacquard by Google – Technology”, 2020). The garment being the sensor itself is why it is very smart.



Figure 5. Jacquard by Google x Levi’s Trucker Jacket gesture movement being demonstrated (2020). Image URL: <https://atap.google.com/jacquard/collaborations/levi-trucker/>

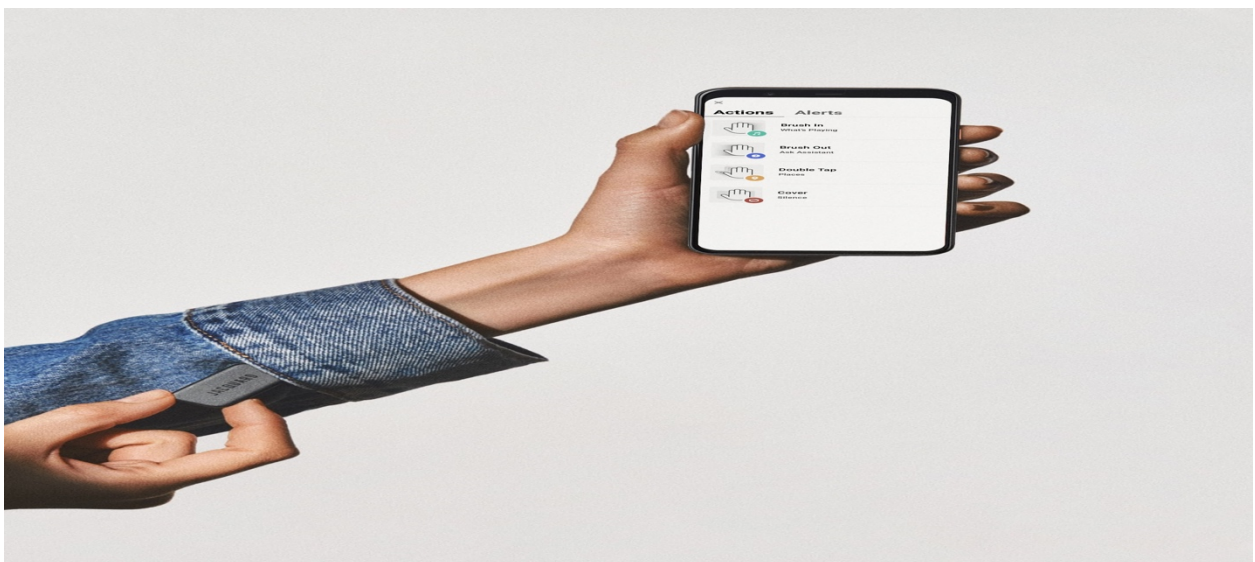


Figure 6. Jacquard by Google tag being placed in cuff of smart denim jacket (2020). Image URL:

<https://atap.google.com/jacquard/>

Smart textiles have expanded to where it is categorized by different spans that define their complexity and usefulness. As more is discovered with technology and textiles to advance our modern lives, we can continue to see developments that transform the meanings behind what we wear.

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