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**Intelligent Interfaces** : Transformation of Self-expression,  
Communication and Fashion with Wearable Technologies

**Title**

Intelligent Interfaces

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| <b>Subtitle</b>                        | Transformation of Self-expression, Communication and Fashion with Wearable Technologies   |
| <b>Lead-in / Abstract</b>              | The aim of this paper is to discuss the change of communication via clothes with the emergence of wearable technologies. It focuses on how wearable technologies could change our experiences from the perspective of communication and self expression. This paper aims to contribute to the discussions in wearable technologies to form a theoretical background within the context of fashion and communication.  |
| <b>Participants and speakers</b>       | Mura, Gökhan (TR)   |
| <b>Short biography of participants</b> | Gökhan Mura has a recently received his MA degree from the Department of Visual Communication Design at Istanbul Bilgi University, where he was awarded with full scholarship. He has a background in Industrial Design.(Middle East Technical University)He has studied on the transformation of fashion from early modernism to wearable technologies with its relations with visualization and communication technologies. He is interested in the relation of design and technology and the transformation of the language of design with the emergence and advance of new technologies.  |
| <b>Full text</b>                       | <p>Self-expression and communication through clothes and the dynamics of fashion system have been experiencing a transformation with the emergence of wearable technologies. Wearable Technologies change our daily experience with clothing especially from the perspective of communication by proposing different examples of interactive garments designed either for increasing the functional aspects of clothing or for producing dynamically changing clothes.</p> <p>The various studies on wearable technologies propose different kinds of garments with both functional and aesthetic properties and expand the domain of fashion with the novel examples they introduce. The existing fashion theory requires redefinition of the conceptual framework of fashion according to the new abilities of clothing developed with wearable technologies.</p> <p>The existing examples and the technologies used for realizing the examples of wearable technologies help us to foresee the possible future examples of the wearable technologies expected to be developed with the advance of material, power and computational technologies.</p> <p>This paper contributes to the discussion on wearable technologies to form a theoretical background for the studies within the context of fashion and communication by trying to examine the existing examples and the virtual examples as the possible outcomes of the ongoing research on realization of the discussed concepts. The paper also aims to contribute to the efforts to introduce the concepts of wearable technologies to the system of fashion and make it a matter of daily experience as a new and talented way of communication.</p> |

## Clothing as a way of Communication

Clothing is a mode of communication. It is widely acknowledged that clothing is a way of self-expression, a way of expressing the identity and personality of its wearer. That the clothes we wear make a statement is itself a statement that in an age of heightened self-consciousness has virtually become a cliché. (Davis, 1992) We dress up according to our personality, identity, status and mood and let clothes express our feelings and emotions via the visual composition we have made. We reveal our choices and emphasize our personality through our bodily appearance to give an impression about ourselves. Likewise, we interpret the visual statements constructed by the clothes of other people. We redefine our bodily appearance with clothing; with the garments we wear and with the accessories we use. We increase the expressive abilities of our bodies with clothing.

Clothing is also an essential element of social communication. A garment carries several meanings for its wearer and the observers - where the meaning has not to be the same for each individual. The meaning of clothing is variable according to the culture and visual traditions of the society where the garment is worn. The message of a garment is also dependent on the context of use and the identity of the wearer. Although communication through clothing is dependent on different cultural variables, clothing is an effective and strong way of self-expression. Within this definition, the word self has the stress on it. Besides all connotative activities of self-expression through consumption, clothing is the one literally related to the body. As clothing, after all, could be considered as the redefinition of the body, it could be said clothing is the strongest way of self-expression non-verbally.

The meaning or the power of a dress is derived from the visual composition formed through the fabrication and presentation of it. The meaning rises on the visual symbols that are the combinations of the cut, the drape, the texture of the fabric, the silhouette or the volume of the dress created through design process. Fashion designers produces so called new meanings by developing the vocabulary of clothing. The new compositions, new permutations or the repetition of retro styles open new spaces for individuals to express themselves through clothing.

Despite the numerous permutations of clothing made up from different pieces of garments and the repeating cycle of gimmicks to play with the visual composition of a garment, the message carried by clothing could be said to be static. The message of a garment or in other words the way of expressing the self cannot be changed unless the clothes are changed.

In today's fast paced, networked and wireless society the dynamics of the society and the advanced communication technology determines the ways of transmitting and receiving of messages and production of cultural meanings with increasing emphasize on customization, participation and interactivity. From this perspective, the static daily clothing could not satisfy the new social needs of its wearer shaped around the need to emphasize the changing identity and communicate the changing moods and emotions interactively. 'In an age where identity is increasingly fluid and multifaceted, the static clothing and unresponsive materials we wear are often insufficient means of expression' (Galbraith, 2003).

## Communication via Wearable Technologies

Wearable technologies enhance the expressive abilities of clothing. Smart technologies embedded expand the capacity of the body and create a new relationship between the body, the garment and the environment. Clothing designers want to create systems of clothing that react, collect information, and enrich our interactions with spaces and people (Galbraith, 2003). New possibilities and modes of interaction between these systems improve the existing ability and introduce new ways of expressing the self in a wider context.

Besides the traditional ways of creating user defined clothes and personal products, the capabilities of advanced technology like miniaturized electronic components and smart materials are used to design pervasive wearable technologies with better possibilities for self- expression. Miner, Chan, and Campbell working on pervasive devices and digital jewelry underline the need to acknowledge and even enhance the users' abilities to address the everyday personal and social needs, in designing wearable technologies for everyday life. They believe that pervasive wearable devices will need to reflect our tastes and moods, and allow us to express our personalities, cultural beliefs and values (Miner, Chan, and Campbell 2001). Wearable technologies increase the expressive abilities of clothes and the accessories as they serve responsive components within the garment or the accessory for a better representation of social awareness, identity, personality and status.

Wearable technologies provide reconfigurable visualities that could be shaped by the wearer by determining the composition of expressive components. Expressive components of clothing such as rhythm, physical movement or visual texture could be created through computation and new examples of new types of clothing based on computing could provide modes of expressions unachievable with traditional garment techniques (Co, 2000).

Wearable technologies introduce the ability to visualize the expression dynamically and interactively. Different forms of wearable technologies, computational garments, digital accessories, and digital jewelry, in this sense could be used as an interface that reflects the responses of the wearer by ascribing meanings to the interactively changing compositions of expressive forms. The new ways to encode and decode messages to be transmitted evolves with the abilities of the communication technologies. The new means of visuality of clothing could be decoded in meaningful statements as they are created as the products of digital, interactive communication culture, where the visual vocabulary of communication is expanded and enhanced according to the change in the definitions of communication and social intercourse by the networks and wireless technologies. Computational processes convert the responses, reactions and messages into visual and tactile data and represent the intercourses and interactions among people and environment by the compositions being produced.

## Wearable Technologies for Emotional Dialogue

A specific example of the enhancement of communication with wearable technologies could be using wearable technologies for emotional dialogue. Responsive clothing has the ability to refresh its appearance according to the input provided by the user, for example, as a representation of the physiological changes occurred during emotional experience. Planalp quotes Frijda to define physiological changes in the body produced by emotions such as the change in heart rate, blood pressure, blood flow, respiration, sweating, secretion, pupil dilation, trembling, brain waves and muscle tensions (Frijda, 1986 cited in Planalp, 1999).

Computational processes could convert senses into visual data and represent emotions with dynamically changing appearances. Digital technologies worn on the body could precisely detect physiological changes in the body when a change occurs in the emotional state of the user. All these changes could be detected and could be used as sources of input for computational response. Besides using physiological changes as input, the physical and social changes in the environmental conditions could be used as well.

Unlike the hard-to-control physiological responses to environmental or personal changes, the physical responses of the wearable technologies could be controlled and directed to express the emotion in a desired manner. Besides developing systems that visualize our physiological responses through using our clothes and accessories as media, we can develop clothes that could dynamically produce emotional expressions by user command in order to enrich our emotional dialogues. The emotional response of the wearer to any occasion could be amplified by presenting noticeable, exaggerated visual compositions such as changing colours or textures of garments; could be concealed by not showing any physical response although it is expected from you and your smart garments, when it is socially not appropriate; or just be speculated or faked by expressing empowered emotional responses to a situation where you socially have to react in that way. The interactive responses of clothing and accessories could be controlled, programmed, instantly changed, or reconfigured according to intentions and could be used to manage the social relations of the wearer.

## Intelligent Interfaces

Wearable technologies create a new understanding of clothing that transform the static messages of classical garments into instantaneously refreshing, self generated messages that are open to any interference and change at any time. This transformation opens up wider spaces for self-expression as it provides a unique expression of a customized composition of individual presence. The appearance of the garment of any wearer is defined according to the context and interaction, thus provides a unique visuality for each individual.

Fashion gives a place for individual expression. Even within the very rigidly defined situations, individuals have been able to introduce original variations. (Davis, 1992) Except a little percentage of haute couture clothes, ready-to-wear clothes are the way for individuals to create variations from a universal set of designed pieces. In this sense, fashion designers present possibilities to consumers to select and bring clothes together for personal expression. With the emergence of wearable technologies this partly passive relation of the wearer with the process of building message of his or her clothes is also a subject of change. Wearable electronics provide a greater elasticity to a user to build a visual statement besides the brand new style of the outlook of the garments. A wearer could customize the dress he or she wears and could apply his or her own personal settings and preferences to a smart garment. The wearer even could develop his or her own software to be used by the garment and actively take part in the design process. This ability to reconfigure the systems embedded and the ability to intervene to the computational processes make wearable technologies a richer medium for self-expression.

Besides their own compositions build up with the smart textiles and the electronic components, wearable technologies have the capacity to represent the compositions of new media as interfaces. Technology allows the functional and artistic features of new media to be transferred on clothes. This new tool of representation, garment, enriches the possibilities of new media and more important, provide mobility to the applications of new media. This is something different than moving computers. The medium where the applications of new media are presented, is used by an intelligent, mobile and interactive organism; the wearer.

Besides the novel experiences the garment provides, the wearer could use the dynamic properties of the garment to direct the process of meaning production by visibility as he or she knows the possible outputs of the computational response that the garment could produce, and behave accordingly. The wearer could unify the expressive abilities of the body and the dynamic and responsive abilities of the garment to constitute a narration. Wearers to produce an intended visual output could also intentionally act out the intercourse among various bodies and garments that produce a certain interactive response. The previously irresponsive garment thus is being transformed into an intelligent interface.

Wearable technologies introduce a new medium of expression by unifying the expressive abilities of the wearer with the dynamic, programmable and controllable compositions served by the garment.

The performance of the wearer according to the stimuli of either natural or man made environment could effect especially the artistic applications of new media as the act of wearing allows mobile, interactive, intelligent and ever refreshing relation between the wearers and the environment. Vice versa, the new possibilities of wearable technologies gained with the increasing capacity of new media provide the wearer a complex ability for individual and artistic expression. The interaction of wearable technologies redefines the personal space of wearers as the garment could interact with the other wearers' garments and with the environment independent from the restriction of sharing the same physical location. The relation of the body with the others and within the space of performance is redefined with wearable technologies and this experience could signify new forms of visual narration.

## **Increased Awareness via Wearable Technologies**

Wearable technologies providing continuous assistance and access to any kind of information that increases the sensory abilities of the user improves the perception and awareness of the user resulting in a heightened communication. Being able to detect the changes in the environment, or being informed about changes in wearer's personal sphere by networks and wireless technologies, creates an augmented self and social awareness. The garment and the wearer become more sensitive and reactive to the context it is worn in, to the space or environment it is used in and to the other garments around and to the intercourse with other people it is included.

Wearable technologies visualize the personal or communal reactions and responses via clothing with serving responsive components that constitute an augmented, enhanced expression. The access to the information of the responses of other users via a system that is worn provides a new degree of social awareness and connectedness. The interactive clothing could be used to constitute a better representation of reactions with dynamically changing visualities, which increases the detection of reaction, both, by the other members of your community and by the spectators of the intelligent interfaces. A stronger sense of community could be achieved with wearable technologies where your membership to the community, your sharing the similar ideals, your awareness about similar concerns and your reactions and responses to these with your appearance become more visible, distinguishable, attractive and efficient without the restrictions of distance. Interactive clothing thus constitutes a common ground for different individuals for sharing similar expressions.

As a result of the advances in wearable technologies, the definition of the relation of the body with clothing turns into a more interactive relation. The new garment could be said to become a smart, movable interface that has the ability to respond to the input both from the wearer and the new environment. The ability to collect data and to process the data to form a visual output make the garment an intelligent interface that unifies the expressive abilities of the bodily expressions of its wearer with its interactive responses to create enhanced expressions and new forms of visibility that could also constitute a communal physical interactive visibility.

## **Fashion and Wearable Technologies**

Wearable technologies propose a novel experience for fashion because the dynamically changing appearances changes the significance of the garment and an interactive garment could produce new and more complex meanings via its

visuality. Western European fashion is pivoted around the concept of "newness" or "nowness" (Fox-Genovese, quoted in Craik, 1994: 6) Consequently fashion is deemed to have no inherent meaning beyond serving as a mean to an end; namely the eternal preoccupation of the system of newness that depends on the desire to acquire each new mode. (Craik, 1994: 6)

Wearable Technologies could provide ever new visualities as the smart dress represents its own message produced as a consequence of an interaction or a computationally controlled process. The visuality of interactive clothing refreshes itself constantly. Interactive clothing or computational garments provide novel visualities according to the change in the input processed to produce the output. The change in the appearance of the dress could be kept constant and also be amplified or exaggerated, by changing the definition of the input and by experiencing an interaction.

Wearable technologies allow pervasive representation of changing visualities. So the appearance of these clothes refreshes their appearance pervasively that provides both newness and nowness.

The way of to perceive a garment, the meanings derived from its appearance is strongly connected to context of use and to the appearance of the other clothes, the style of clothing of the society and to the images of the clothes represented in mass media in that society. However, the way to perceive wearable technologies is also dependent to the existence of the "unseen" network of the other wearable technologies, and to the interactions between these elements. The visuality, thus the perception of the garments, thus the elements of fashion are defined and determined by the interactions.

The interactive clothes that "work" in accordance with the interactive environments would also change the definition of fashion designer while being included in the system of fashion. As the designers of the clothes that work with computational technologies have to consider the interaction and the user experience besides the physical form of the garment, a new "hybrid" definition of fashion designer would appear who uses the domains of clothing design, software and electronic system design. Also, as the software of computational processes is updateable, developing newer releases of the same wearable technologies would be a path for fashion to process. New releases, updating the old releases, downloading new software to the clothes would also require programmer-designers that could serve the technical service to satisfy the new needs occurred. Wearable technologies thus not only provide novel experiences for expression and communication to the wearers but also introduce new definitions of fashion and fashion designer and introduce new concepts to the business of fashion where they will exist and become commercialized.

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