FASHIONABLE WEARABLES IN DIGITAL PERFORMANCE

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This paper explores how fashionable wearables affect digital performance, stressing the sensual and embodied abilities of electronic arts. Focusing on the notion of 'wearable performance', this study explores its link to the theory of remediation, providing a conceptual framework that includes re-embodiment, digital bricolage and interdisciplinarity as the effects of fashionable wearables in digital performance.

Introduction

Proceeding from the notion of the 'wearable performance,' [1] this study stresses the display and performative aspects of wearable technologies in the performance context. In particular, performative garments generate digitally mediated events in the wearable space. Revealing digital performance as an interface of creative activity, this paper analyzes how wearable performance remediates digital performance, enabling three particular effects: re-embodiment through the wearable space; digital bricolage as artists' experimentation with wearable technologies; and interdisciplinary collaborations that provide new creative structures for the wearable performance.

The first part of this paper presents the current trends in fashionable wearables, highlighting key theoretical points, [2] [3] while the second part focuses on digital and wearable performance. [4][5] [6] The third part introduces the theory of remediation, [7] presenting re-embodiment, [8] digital bricolage [9] and interdisciplinarity; [10] which are further discussed in the next part, while tracking future research implications.

Fashionable Wearables

In 2000, Sabine Seymour introduced the term 'fashionable technologies' in order to describe wearables that rely on the intersection of design, fashion, science and technology. By coupling expressiveness and functionality, fashionable wearables fulfill high aesthetic and stylistic requirements, in contrast to the weirdness of wearable computers, incorporating electronic textiles and smart garments. [2]

Electronic textiles, including technically enhanced textiles enabled for sensing, communication, power transmission, and interconnection, and smart garments, which can "sense stimuli in the ambient environment…see and smell on behalf of the wearer," [3, p. 12] create new standards of "wearability, comfort and aesthetic"; acting as embedded interfaces that contain microprocessors, sensors, actuators, software or intelligent materials. [2, pp. 15-16] Thus, fashionable wearables emerge as an interface between the body and the environment, able to communicate and interact with other digital agents. [2]

In particular, fashionable wearables can take the form of 'interactive interfaces' that electronically change surface patterns, based on embodied or environmental stimuli. [2] [3] As interactive interfaces they require inputs, outputs and the ability to communicate with digital media. Inputs include textile or

embedded sensors that capture data from the body (blood pressure) or the environment (light or humidity). Outputs are usually technologies that can be seen (Light Emitting Diodes/LEDs), felt (heating), touched (conductive fabrics), heard (speakers), and smelled (scent capsules); while the ability to communicate refers to technologies such as ubiquitous computing and wireless communication (WIFI, GPRS, RFIDs). [2]

Fashionable wearables can also sense human emotions, as 'emotive interfaces' that capture and broadcast feeling and mood. [3] Based on artificial intelligence that recognizes emotions such as "anger, fear, sorrow and joy", an emotive interface visually broadcasts our emotions, resulting in changes in the wearables' surfaces and/or forms. [3, p. 22] For instance, fashionable wearables "can identify the increased heartbeat and the perspiration that accompany fear as easily as they can record changes in the wearer's health." [3, p. 24]

While fashionable wearables' applications range from medical applications or electronic fashion, this paper concentrates on digital performance, focusing especially on the wearable performance. [1]

Digital Performance

Although technologies have intersected with theatre and performance since their very beginning, [4, p. xxii] digital performance mainly flourished throughout the 1960s as an effect of the "cross-fertilization between theatre, dance, film, video, and visual art", based on interdisciplinary collaborations between artists and scientists/engineers, [11, pp. 32-33] Digital performance, also known as multimedia performance or performance art, is an art form that includes "all performance works where computer technologies play a key role rather than a subsidiary one in content, techniques, aesthetics, or delivery forms." [4, p.3]

In some cases, digital technologies are highly visible to the audience but not interactive with the performers, usually taking the form of video projections or sounds; [4] while in other cases they are invisible, applied as digital tools in the design of a digital performance. [6] However, digital technologies usually generate various forms of interactivity between performers and digital artefacts. For instance, Cunningham's digital performance 'BIPED' (1999) engaged dancers' interaction with pre-designed digital forms produced in a studio based on 3D motion-capture software. [4]

In addition, alternative forms of interactive digital performances explore interactivity between performers and live-created abstract digital images called 'sprites', which are created by a performer-operator on a graphics tablet and are instantly projected on stage. [12] Other modes of live-created digital artefacts include effects such as the digital double, the digital twin of the performer's figure captured by digital media and projected on stage; performance in virtual environments; or the distribution of choreography among different locations. [4] Thus, digital performance engages with various forms of interactivity, whilst still sustaining an external relationship between the performer and the digital artefact.

Wearable technologies emerge as an additional stream of experimentation in digital performance, enabling an internal relationship between the performer's body and digital technologies, as they manifest "the transition between the inside (biological/emotional) and the outside (gesture and movement with the smart materials/garment) which affect the visibly and audibly revealed (screen and sonic architectures)." [1, p. 106]

Despite the early attraction of performers to experimenting with wearable technologies, these initial applications only incorporated wearables as flexible surfaces for digital display. [11] Later explorations in the field of electronic music performance integrated the sensing technologies of wearable computers with digital performance. For instance, in her project 'Ladies' Glove' (2004), performer-musician Laetitia Sonami "turned their bodies into alternative 'controllers', translating real-time flesh-and-blood movements into synthesis parameters through wearable sensors, carried objects, maladjusted instruments, and augmented outfits." [6, p. 217] Through gestures, these technologies experimented with broadcasting internal aspects of the performers, causing them to be visibly and audibly revealed. [1]

Focusing on wearable technologies in digital performance, Birringer and Danjoux (2009) coined the term 'wearable performance', distinguishing display and performative/interfacial garments. On one hand, display garments make wearables part of performance's digital environment, by broadcasting on their surface the performers' embodied conditions and environmental stimuli, or the audience's reactions, based on various programmed patterns. On the other hand, performative/interfacial garments operate based on a sensorial embodiment that senses the performers' bodies and actuates changes in the digital environment. Performative garments enable the 'wearing of space', performing real-time patterns based on embodied and environmental stimuli. [1]

Projects on the wearable space experiment with sensory technologies, and the connectivity between the wearers and their affective environments. For instance, Kozel and Schiphorst's project 'exhale' (2006) used sensors to capture the breath patterns of wearers, which were projected onto their wearables (self-to-self interaction) or onto those of other participants (self-to-other interactions) as vibrations and fans. The wearables were also able to capture the collective breathing patterns of a group of participants, translating them into visible or audible representations on wearables or other devices. [5]

Birringer and Danjoux (2009) stress that designing for the wearable space requires new perspectives that exceed 2D/3D design. Their research project 'design in motion' introduced a new design approach that fostered the development of wearables based on interdisciplinary practices that share elements from films, architecture, or dance; as well as digital art and interactive installations. The concept of design in motion springs from the "collaboration between choreographer, designer, digital artists, composers and engineers", and "focuses on the real-time relationship between the tactile performance experience of the garments and the projective visual and acoustic/sonic visual environment." [1, p. 98]

Fashionable wearables, and especially the wearable performance with its performative garments, have had a unique impact on digital performance; shifting the performers' external interaction with digital artefacts into an internal relationship that integrates wearable technologies as digital extensions of their bodies. This paper analyzes this impact based on the theory of remediation, providing a conceptual framework of the field by identifying three effects of fashionable wearables in digital performance.

Remediation of Digital Performance

The concept of remediation describes "how new media forms emerge from older ones," [7, p. 83] based on two opposing interface design strategies: 'the strategy of transparency' and 'the strategy of reflectivity'. Transparent interfaces deliver information to users with clarity, accuracy and efficiency, while reflective interfaces aim to generate an interactive and compelling experience. As no digital design can achieve pure transparency or reflectivity, all interfaces share both transparent and reflective elements. [7]

Digital performance reveals interface qualities, delivering information in terms of transparency and generating interactive experiences between the performers and the digital artefacts. In particular, digital artefacts, such as pre-designed forms or digital doubles, require effective transmission and display of data; while reflectivity shapes the ontology of digital performance as an interactive experience and integrates it with these digital artefacts. In general, digital performance emerges as an interactive interface that remediates non-interactive forms, exploring various forms of interactivity that drive the evolution of interactive digital performance.

However, wearable performance remediates further digital performance, introducing the performative interface that links the performers' senses, the stage's architecture, and, in some cases, the audience with real-time compositions on the wearable space. [1] [5] [7] The performative interface incorporates transparent characteristics, stressing the functional dimensions of the affective and sensing technologies that maintain effective communication between the inside and the outside, as well it demonstrating reflectivity as a responsive co-performance of performers and fashionable wearables in real-time. [1] [7]

In particular, the remediation from the interactive to the performative interface causes three particular effects: (1) re-embodiment, (2) digital bricolage, and (3) interdisciplinarity.

(1) RE-EMBODIMENT

Hansen [8] introduces embodiment, disembodiment and re-embodiment as three interrelated terms that describe the integration of the body with digital technologies. Embodiment is the process that enables the body to generate informational objects, such as images, space and events; disembodiment is the process that captures and transmits embodied data across different digital agents, transforming the body into a 'body-in-code;' [8] and re-embodiment is the "convergence of technology and the body that facilitates the extension of the body into other dimensions." [13, p. 77]

While embodiment and disembodiment are evident in interactive digital performance, such as in the cases of digital double or distributed choreography, the performative interface is only realized through re-embodiment, which considers fashionable wearables to be an indispensable digital extension of the performers' bodies. [13] Re-embodiment becomes the necessary condition for the generation of the wearable space that shapes the wearable performance's reflective experience. [8]

(2) DIGITAL BRICOLAGE

While bricolage derives from "the remixing, reconstructing, and reusing of separate artefacts, actions, ideas, signs, symbols, and styles in order to create new insights or meanings," [9, p. 70] digital bricolage of wearable performance exceeds the mere aesthetics and style of fashionable wearables, indicating design for the wearable space.

Digital bricolage indicates a new stream of digital experimentation in digital performance, as well as a process that invites performers and designers to interact with fashionable wearables in order to shape them as performative interfaces that demonstrate functional, aesthetic and performative qualities in the wearable space. [2] Digital bricolage requires a new combination of professions, skills and methods that remediate the creative process of digital performance; paving the way for new challenges, such as how to design for the wearable space.

(3) INTERDISCIPLINARITY

Interdisciplinarity is defined as cross-discipline integration and communication, aiming to produce context-specific knowledge through new structures and collaborations. [10] In fact, interdisciplinarity has been evident in digital performance since the 1960s, sharing skills and knowledge between the domains of art, engineering, and science; as well as important cultural organizations and academia. [6] In wearable performance, interdisciplinarity establishes new collaborations that integrate fashionable technologies and digital performance, mixing skills and practices in order to create the performative interface. [1]

Furthermore, the interdisciplinary integration of fashionable technologies and digital performance results in a mutual ontological impact between disciplines that affects their evolution. [10] Wearable performance represents the ontological impact of fashionable wearables on digital performance; while the introduction of the performative along with functionality and aesthetics comprises the ontological influence of digital performance on fashionable wearables.

Discussion

Fashionable wearables remediate interactive digital performance into wearables performance, resulting in significant effects on the creative practice. The wearable performance enables transparent qualities in terms of functionality and effective communication among the responsive network; while reflective qualities link the performer's senses and embodied conditions with the audibly and visibly perceived. Ultimately, wearable performance emerges as a novel mode of digital performance, as the performative interface remediates the interactive, effecting re-embodiment, digital bricolage and interdisciplinarity.

Re-embodiment remediates the performer's body, which is realized as a performative interface in mixed reality as flesh overlaps with digital technologies. [7] As fashionable wearables become the digital extension of human senses and the performer's body, re-embodiment enables the body to become an active digital agent shaping a visible, sonic or sensual experience that functions in terms of an affective network. [8] Re-embodiment results in a shift of focus of digital performance from the external interaction performer/digital artefact into the internal interaction of performer/wearable that transforms the body into an interface linking emotions and expressions to the wearable space.

Digital bricolage remediates the process of designing for the digital performance. Interactive digital performance seeks design principles that capture and display digital artefacts on stage, while integrating them with the performers' bodies. In contrast, wearable performance, through the process of digital bricolage, aims to design for the wearable space; and therefore seeks novel design practices that integrate different disciplines and methods, such as the concept of design in motion developed by Birringer and Danjoux (2009), which aims to create for the performative interface. [1]

Interdisciplinarity collaborations remediate digital performance as new structures which are formed to create for the wearable performance. By challenging the role of the choreographer as the artistic originator of digital performance, wearable performance introduces new roles, such as the fashionable wearables designer, which collectively compose digital performance. [6] Through the ontological effect of interdisciplinarity, [10] elements from other disciplines, such as digital art, are also expected to infuse digital performance.

Finally, the application of fashionable wearables in digital performance revisits the theory of remediation, and especially the notion of reflectivity as the only alternative to transparency. While the performative interface emerges as a form of enaction that exceeds the external character of reflectivity and interaction, re-embodiment merges the live with the digital in a state of mixed reality. [4] In particular, wearable performance demonstrates the performative that implies "a world in which subjects and objects have not yet come into being, and even if materialized, are always in a constant state of flux and transformation that is unstable and difficult to repeat." [6, p. xxvii] This notion of the performative emerges as a key element in the design of fashionable wearables in digital performance; at the same time challenging the theory of remediation by the introducing the performative as an alternative or more refined version of reflectivity.

Future Implications

Future implications can focus on the development of case studies of wearable performances, surveying diverse forms of remediations and performative interfaces. Springing from the new performative qualities of wearable performance, future studies can also focus on the intersection of fashionable wearables with other digital design fields, such as interactive architecture. An additional future implication can study the performative interface in real-life context beyond digital performance, capturing broader cultural implications of wearable technologies in contemporary life.

Conclusion

Fashionable wearables remediate digital performance, shifting from interactive digital performance that enables the performers' external interaction with digital artefacts to wearable performance that enacts the performers' internal interaction with wearable technologies on the wearable space. In particular, this remediation results in the emergence of the performative interface that causes three particular effects in digital performance: re-embodiment, digital bricolage and interdisciplinarity.

Re-embodiment generates wearable performance as a new type of digital performance that places the body and fashionable wearables as its indispensible extension, at the centre of all experience. Digital bricolage introduces new processes in the design of the performative interface, as the development of fashionable wearables becomes a new stream of digital experimentation for the wearable performance. Interdisciplinarity provides new structures of collaboration that integrate diverse professions, skills and methods.

Interdisciplinarity facilitates the ontological impact of the contributing disciplines. While wearable performance emerges as the ontological effect of fashionable wearables in digital performance, the performative is expected to infuse the development of fashionable wearables in addition to functionality and aesthetics, as a spin-off from the wearable performance. Finally, the study of wearable performance contributes to the theory of remediation, revealing the performative to be an alternative or more refined version of reflectivity.

References and Notes:

1. *Johannes Birringer and Michèle Danjoux, "Wearable Performance," in Digital Creativity 12, no. 1-2 (2009): 95-113.*
2. *Sabine Seymour, Fashionable Technology (Vienna: SpringerWienNewYork, 2009).*
3. *Bradley Quinn, Textile Futures (Oxford-New York: Berg, 2010).*
4. *Steve Dixon, Digital Performance (Cambridge, MA: The MIT Press, 2007).*
5. *Suzan Kozel, Closer (Cambridge, MA: The MIT Press, 2007).*
6. *Chris Salter, Entangled (Cambridge, MA: The MIT Press, 2010).*
7. *Jay D. Bolter and Diane Gromala, Windows and Mirrors (Cambridge, MA: The MIT Press, 2005).*
8. *Mark B. N. Hansen, Bodies in Code (London-New York: Routledge, 2006).*
9. *Mark Deuze, "Participation, Remediation, Bricolage: Considering Principal Components of a Digital Culture," in The Information Society 22, no. 2 (2006): 63-75.*
10. *Georgina Born and Andrew Barry, "Art-Science: From Public Understanding to Public Experiment," in Journal of Cultural Economy 3, no. 1 (2010): 103-120.*
11. *Michael Rush, New Media in Art (London: Thames & Hudson, 2005).*
12. *Sita Popat and Scott Palmer, "Embodied Interfaces: Dancing with Digital Sprites," in Digital Creativity 19, no. 2 (2008): 125-137.*
13. *Pramod K. Nayar, An Introduction to New Media and Cybercultures (Chichester: Wiley-Blackwell, 2010).*