The Virtual Life of Textiles: a Provisional Haptic Library Model

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Abstract

The knowledge economy and the subsequent digitization of all cultural forms have transformed textile and fashion archives into an active part of the storytelling and design of new goods and services, turning them in all effects into knowledge laboratories (Spencer et al. 2020; Akiwowo et al.,2019). However, despite the possibility of constant reinterpretation and combination of content which textile archives activate and the obvious educational potential they hold (Lee and Leong, 2019; Mechan, 2020), these repositories remain currently underused. As fashion data experience in a 'phygital world' becomes ubiquitous, material archives are called to design more meaningful interactions with technology (Lean, 2020, Iannilli and Spagnoli 2021). Although rapidly evolving technologies manufacture the actual and virtual surfaces of today (Montilla et al., 2014), altering our perception thereof, they are currently not able to offer the user the level of understanding of textile properties that physical manipulation and viewing provide (Igoe, 2020). Haptics remains thus one of the most challenging areas for virtual textile experience design.

This article addresses the untapped haptic potential of digital textile collections by outlining a theoretical model relying on visual hapticity (Lécuyer, 2009) rather than the use of haptic devices (Furukawa et al. 2019), which is the more common approach. Visual hapticity remains underexplored in fashion mainly because it is underpinned by complex cognitive processes (Jang and Ha, 2021; Mlakaret et al. 2021). Thus the main question arises: how can an embodied approach to 3D technologies expand haptic visuality and expose the haptic/tactile qualities of materials, inducing an extended sense of touch and producing a more immersive, dense and intense user experience that enables the acquisition of tacit knowledge? We aim to answer this question by proposing a theoretical model where haptic visuality, meta-materiality and immersive exploration represent the fundamental basis in the interaction between media and tools that can enable new experiences in the digital environment.

The paper adopts a Research Through Design (Frayling, 1994) (RtD) approach that employs project-grounded actions to advance knowledge with the methods, practices, and processes of design practice. RtD proves

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useful insofar it enables us to interpret our design artifact i.e the haptic library model, as a transformational outcome leading to a preferred condition. The library model produced in this type of research becomes thus a design exemplar, providing an appropriate conduit for research findings to easily transfer to fashion research and practice communities (Zimmermann et al, 2007). Following this methodology, our paper unfolds the outcome of the first of the three steps of the design process for a new haptic library model - the pilot phase - that aims to define the process, gather test materials and develop the framework for experimenting with 3D-haptic textiles. It also discusses implications for the following two steps of the project: 2. Prototype phase aimed at building the first functional prototype of the haptic library project; 3. Scaling up the model testing and using the framework within institutions and private companies.

The proposed model of haptic textile library has implications both for design theory and practice. Theoretically, it advances research in visual hapticity applied to fashion, by experimenting with more integrated approaches which leverage on latest studies in film practice as well as 3D modeling and scanning of textiles. On a practical level it has important implications not only for institutional repositories which can create new experiences for their collections, but also for the communities of designers and design education institutions. A model that democratizes access to new ecological textiles and integrates innovative principles (modularity/reuse/co-creation) in its core functionalities is ultimately fundamental for creating new opportunities for visual education in fashion that leads to a more eco-sustainable future.

Keywords: visual haptics, fabric hand, haptic library model.