PERFORM – DIGITAL MOVEMENT IN THE MAKING

CONTROLS, DYNAMICS & ENGAGEMENTS

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ABSTRACT

Commercial sensor-based technologies offer efficient mechanisms for capturing detailed movement data today. These pre-determined calibrations and representations are used to design solutions that indicate how people *should* move in order to achieve certain goals. This presents an ethical power *imposition* that resides in the computational prowess within processing to activate prompts and smooth out errors by ignoring or discarding movement outside of what is deemed useful. Our discussions on movement come out of two research projects *Somantics* and *Sync* in which we developed digital tools to observe changes in user agency when movement becomes the focus of a chain of responsive actions and reactions - affect and effect - made possible through digitization. The projects were undertaken with people with atypical movement experience, from expert dancers to children on the autistic spectrum. We discuss the need for reframing an ethical and critical discourse on digital movement to understand the sensate and social means with which we all use our bodies to regulate and rehearse, communicate and connect.

INTRODUCTION

Body movement can be a resource for design that brings forward the potential for the communication of characteristics such as age, ability, health and history. Movement also allows for qualities such as intent, intensity or frequency to be expressed, as well as cultural and social relations. Movement can be observed and is a visual medium that immediately fades, existing only as it appears:

> There is nothing rock solid in movement […] That empirical fact in the end motivates many to believe that matter matters more, and in turn to concentrate attention on the study of objects (Sheets-Johnstone 2011: 124).

The sensation of movement or body stimuli through the integration of other senses, such as vision and hearing is known as *kinesthesia.* From a design perspective, kinesthesia offers a rich and dynamic mode for incorporating user data that can be individually expressed, such as "shifting, pulsating, writhing, dancing, expressive action of bodies in space over time" (Reynolds and Reason 2012: 12). Technology is fervently being developed to make meaning out of movement by developing computational ways to identify emotion or gender, intent and identity, by capturing the very way we move. This performative aspect of human agency – our capacities for action - functions as a space in which social possibilities are both rehearsed and performed (e.g. Hewitt 2005).

In interaction design, the immaterial traces of human movement can be made material in responsive and ethically considered ways. Instead of movement interventions that aim to measure or correct movement in relation to given goals, one may give movers access to an individually constructed movement pattern that is meaningful to them and it is in this realm where our work opens up possibilities for atypical movements to be expressed, included and considered in design processes (see Figure 1).

DIGITAL MOVEMENT

'All human activity depends upon an imputed background whose content is rarely questioned' (Thrift 2008: 91). Yet, our environments are not passive backdrops in which we live our lives; rather they are increasingly digitized and activating configurations in which we choose how to act and where our everyday routines are played out. Today environments incorporate computational scripts that operationalize our movement data or our activities and make them matter in particular ways, whether by opening automatic doors or alerting us to when we step into a forbidden area. Such computational scripts are written prior to the acts that activate them, and reside in code – inaccessible and hidden – as we experience such interactions. The scripts become apparent in our altered and adapted movements by way of digital prompts and influences. And these movements are rarely examined in regards to their performative potential and ethical implications (Hansen 2014).

Our focus is on addressing the phenomena of movement and the ways in which movement may now be made digital. We are concerned with how movement data is collected, calculated and called upon and in turn, how this allows for the making of new responses and new movements.

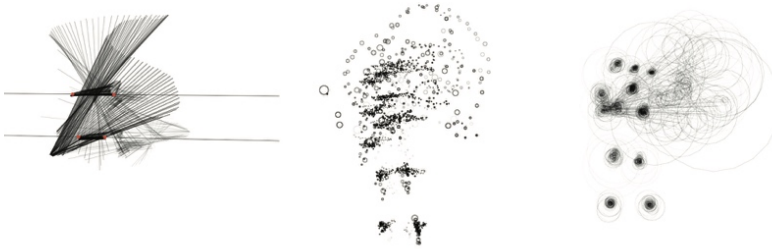

Figure 1: *Sync* A captured movement phrase – a wave - represented in three different ways, each emphasizing different movement qualities. The variety make apparent the possible choices of what is made to matter in the collected movement data. *© Lise Amy Hansen 2017*

COMPUTING POWER

Our work is concerned with how movement is materialized and rationalized through computational power. Through our ongoing research and design projects we argue that there are creative and critical decisions that determine the way in which physical actions are classified. Here we will discuss three normative aspects in making movement digital: 1) the computational requirement of classification in the reading of movement, 2) the pre-calibration or pre-set remit of sensor technology 3) the complexity of accounting for variation and relation in responsive digital systems.

READING MOVEMENT AND CAPTURING DATA

It is in the current reading and capturing of data that we argue, 'what you see is what you get' is a concern only when the activity that matters is highly active and amplified. On the one hand, it is a concern that technology recognizes and acknowledges certain activities (thus narrowing the range of our activities), and on the other hand, it suggests a skewed importance on activity over inactivity. And this importance is part of the necessary processes of materialization of data:

> *"However immaterial [digital information] might appear, information cannot exist outside of given instantiations in material forms" (Blanchette 2011: 1042).*

The risks of categorising movements according to recognizable, cognitively perceived functions are that we tend to disregard unexplained, unreasonable and unwanted movements. For example, non-movement, and instances where we hesitate, stumble or take time out to reflect, is vital to interpersonal meaning-making. Natural pauses are important markers in our everyday social lives, yet they are rarely acknowledged in the calibration and replication of digital movement.

PRE-CALIBRATED SENSORS

Sensors will require some pre-calibration in their mechanical set-up. In turn, when we interact with sensors, we learn by trying out –acting out – in order to understand what is 'seen' and not 'seen', and then we act accordingly. In this way, the sensors may condition our movements, and become the means of normalizing certain movements whilst by disregarding other movements. Thus, the mapping of movement data may have a recursive effect, as it acts as a memory device *'that is also the basis for projective action'* (Cosgrove 2003:137).

Even the most openly sourced and creative digital tools are created for a reason and thus '*encapsulate craft knowledge, working practices, and cultural assumptions*' (Haigh 2009). This motivates us to query the current tendency for repurposing movement knowledge, practices and assumptions and ask whether designers' repertoire of tools address the ethical and individual aspects of movement or the balance of power between designer and performer.

A SYSTEM APPROACH TO RELATIONAL MOVEMENT

Another concern is the effect of the affect not being accounted for, i.e. the ensuing action after perceiving the computational scripts that attend to the movement data and render visual real-time presentation to which we may respond: "*The space between performance and ordinary life is a space for intervention and change"* (Shaunessy 2005).

In human terms, our understanding of the world is made by way of movement, as a sensate being, not merely through cognitive means (e.g. Noë). In the desire for the computation to make logic – we argue that what we need in making digital movement inclusive and innovative, is not necessarily logical nor cognitively pre-conceivable. Thus, we suggest a focus on how to facilitate a connection between movement and computation, in order to access, extend and leverage our own movements in novel and inclusive ways.

KINESTHETIC POTENTIAL

We suggest an expanded and repositioned approach to movement – whereby the unwanted and not registered movement as well as the hesitations and reflective movements are made to matter, perhaps not in immediately logical or cognitively reasonable ways.

We propose that there is a potential for digital media to leverage our movement expertise, not only as a singular attribute of a body mapped in blinding detail, but as an empowered actor in a system of (digital and other) relations involving our presence – our agency - in a configured socio-material environment (Ingold 2000).

In particular, there are scenarios where our digital environments require us to act in certain ways – where we are motivated, allowed or given permission to move or perform our movements in particular way. Here we argue, we must account for or find ways to attend to kinesthesia – the sense of movement. In other words, find ways to account for what moving this way or moving that way, may mean for our own bodies –our own personal experience - both individually and in regards to social relations.

The kinesthetic sense also includes more than simply a momentary experience of moving or indeed stillness, as it encompasses both past performed movements and a projection of future movements. This means that time and intent must be accounted for in exploring kinesthetic movement.

By capturing data to stimulate kinesthetic awareness of movement, we aim to stimulate a responsive, reciprocal relationship between affect and effect, whereby participants decide how, and when, to mediate. As such, mediation is a process of perceptual discovery – facilitated through listening, pausing, prevaricating and so on. The body is not merely an object of perception, that can teach us about perceiving, rather the body acts on reciprocity and relational dynamics. In such a scenario the researcher's approach is liberated to engage imaginatively through participatory, exploratory structures rather than through diagnostic objectives, so the environment becomes an intermedial playground, facilitating knowledge exchange. With this background, we will now discuss three possible pathways forward; kinesthetic agency, self-reference in a somatic practice and relational development.

PERSONAL KINESTHETIC AGENCY

We argue that movement has an agency – a capacity for action – to subvert and innovate in the constant explorations and variations in our future movements. This take on movement differs from a purely somatic body that acts from some form of urge or unrestrained pre-social drive (Hewitt 2005). Rather we ask, why is it that we don't just move the way we have learnt to move? In every repetition, we explore and vary, we alter and augment, shift and shape new ways of going forward in this world (se Figure 2). When we find the opportunity to recursively iterate, correct and connect, we may also push the boundaries of what is meaningful:

> We can leave our marks in the wrong place, invent private or countercultural mark systems, or use mark making as an exploratory project, investigating how our bodies might move differently and thereby achieve materialization and cultural legibility in unexpected ways (Noland 2009: 215).

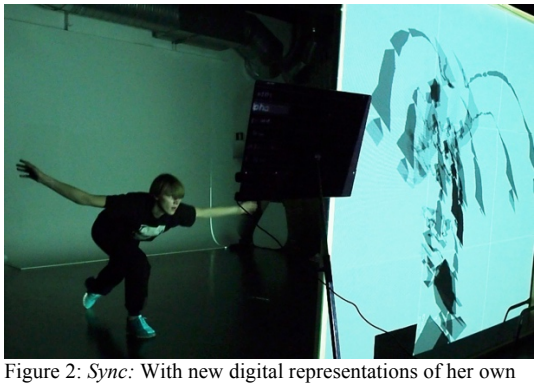

Figure 2: *Sync:* With new digital representations of her own movements presented in real-time and on a 1:1 scale, chorographer Solveig Styve Holte exntends and explores her possible movement repertoire © *Lise Amy Hansen 2017*

Figure 3: *Somantics:* With real-time visualizations of their movements, children on the autistic spectrum explored and engaged in their own movement in sophisticated and social ways, and led us to question the discarding of what is considered atypical movements *© Cardiff Metropolitan University 2017*

SELF-REFERENCE IN A SOMATIC PRACTICE

In our approach to a critical reading of digital movement, we begin from the position that the body is a dynamic and sensate origin of action (Farnell 1999). We aim to make physical the act of reading data, so that it can be a non-deterministic, rather than hegemonic, medium for the production of meaning in digital movement. In this sense, we are troubling the computational trope of precision and imitation, and wish to facilitate a material meaning-making engagement whereby non-typical movement and neuro-divergent perceptions may be played our and enrich our pre-conceived ideas of what movement is or could be (see Figure 3). Our research with participants lead us to question the discarding of atypical movements that may reside outside the sensors' pre-set concerns and to argue for a more inclusive as well as ethical consideration of movements such as those that appear dynamically still or joyfully hyperactive.

RELATIONAL DEVELOPMENT

In our work, we have challenged the computational impositions on movement, whereby technology conditions and conforms the way we move. From an ethical perspective, this process of 'capture – representation – responsiveness' serves to avoid a diagnostic model, and positively positions movement as the core access point for empathic research, design and creative practice:

> Action can be experienced as both a visual image and a movement sensation thus engender an affective response in another person and enhance the cognitive capacity to take the perspective of another (Reynolds 2012).

In this way, our work raises questions on issues of human efficacy and agency, and in turn of the ethics of how movement and bodily interaction are positioned and understood in techno-centred innovation - and design – processes.

WHY KINESTHESIA MATTERS

Our practice-based research undertaken with trained dancers and choreographers as well as people with developmental disabilities had led us to take an alternative position on designing with movement. In this work, we have studied how movement data can highlight or intensify the user's corporeal engagement and thereby impact upon their own perception of identity and social connection.

In our research, we have designed software (such as *Sync* and *Somantics)*, which has prompted us to query presumptions on what movement matters, in which ways and for whom. This work has challenged us to think differently about the ways in which we are inclined to translate and transmit movement, both creatively and computationally. We have found that central understanding the agency vested in the sensate body is to facilitate authentic participation through design, inviting performers to enact, rehearse, iterate and critique. Of particular interest is how the relationship formed with the digital visualized moving body invites others to make a dynamic connection that is grounded in empathy rather than change. The representation is fluid and depends on the ensuing action, in turn forming the experienced moments as we are able to capture in a representative still image (see Figure 2 & 3).

These partnerships have enabled us to observe and experiment with ideas for harnessing kinesthesia. Most of these visual experiments have elicited simplistic representations of body schema, flowing and nuanced, morphing and extending in response to body position and muscle tension. In this respect, movement data calculations and the generated visualisations can function (in real-time settings) as a provocation of the senses, giving access to different perceptual worlds (Bogdashina 2016) and facilitating knowledge exchange. As we have argued, it may also reveal an ethical relation that takes place at the level of kinesthetic sensibility, not at the level of cognitive consciousness.

WHY MOVEMENT MATTERS

Software tools such as *Sync* and *Somantics* prompt a visual understanding of the moving body, drawing attention to the limitations, prescriptions and potentials of our coded bodies (Walker et al. 2012). In this sense, movement visualisation can also be a step toward a critical stance, which prevents us from taking the transformation of human movement through technology for granted, whilst prompting us to investigate, intervene and debate the ongoing objectification and materialisation of human movement.

PERFORMANCE, NOT REFERENCE

Together, these approaches form a central, yet rarely examined discourse in positioning future movement, in particular if we are to understand the shaping of our environments as a practice, or a series of practices, rather than merely as a technical operation outside the concern of human agency (Coyne 2010).

When visual data amplifies our movement sensations they become the performance that makes the ordinary extraordinary, the space for ethical "encounters" that value imaginative, visual and imagistic modes of reasoning. Our work troubles the system of movement capture by asking whether there are other modes of signification – other ways of making digital movement matter than as reference - rather that are oriented toward production and performance.

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