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# DOCILE SUBJECTS

## From theatres of automata to the machinery of 21st-century media

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This chapter juxtaposes the historical theatre of automata with 21st-century media (Hansen 2015) to explore the disciplinary potential exerted by algorithms. Automata form the pre-history of modern automation and computation (Koetsier 2001). While automata run on mechanical algorithms, materially embodied in cogs and wheels of clockwork mechanisms, today's algorithms are mediated through mathematised calculations, automated across networks of smartphones, computers, social media platforms, and an Internet of Things. Algorithmic controls could also be extended to the surfaces of the body through wearable technologies.

If algorithms of automata could be seen as an embodiment of discipline and docility (Foucault 1979; Schaffer 2013), how do digital algorithms govern and control their subjects? In particular, I look at the adoption of disciplinary strategies in Quantified Self (QS) products and reflect on the cultural politics of algorithms and the creation of docile subjects.

### Mechanical dreams and automation

The invention of algorithmic control could be traced to the mechanical dreams of automata in 14th–17th centuries in Europe. 'Algorithm' refers to 'a fine number of steps using logical if-then-else operations' (Terzidis 2006: 65), which in the case of mechanical devices is programmed into the machinery itself. Precise measurements in the distance between cogs, pulleys, and gears, together with weight systems and coiled springs, form algorithmic mechanisms. Two particular inventions described here illustrate the interconnection between mechanical algorithms and discipline.

The Mechanical Theatre in Hellbrunn Palace in Austria, commissioned by Archbishop Jakob von Dietrichstein in 1740s, comprises over 200 wooden-carved moving figures. These figures perform the mechanical algorithms pre-programmed in the design and stage the scenes of life of 18th-century Salzburg: below in the town square, the bustling activity of carpenters, potters, bakers, masons, street performers; above on balconies and towers, aristocrats look on as their subordinates toil away, duly performing their duties, forever obedient. Simon Schaffer (2013) argues that wooden figures in the Mechanical Theatre embody docile bodies, subjugated under the gaze (and control) of the aristocrats. In his view, the theatre performs the desire for 'perfect' subjects of the state.

Jacques de Vaucanson's 'The Flute Player' (1737) uses a mechanical algorithm to control blowing pressures for sound production. This was not only a mechanical wonder and a charmed spectacle for the higher ranks of society, but also became a key step in developing mechanised automation for industrialisation. To improve productivity, Vaucanson invented the first automated mechanised loom for Lyon's silk manufacturing industry using punch cards. His invention was later modified by Jean-Marie Jacquard, whose Jacquard loom[1] became an ancestor to the punch cards and tapes that prototypical computers ran

on a century later. Vaucanson's invention shows how historical automata, often for entertainment, could form the basis for automation through machinery – a ploy to increase productivity.

Kara Reilly argues that this shift from the theatres of automata to the advent of automation marks a significant cultural moment towards the shift into mass-produced workers through robotics (2011: 150). Jessica Riskin points to the equivalence of machines to slaves, conscripts, and workers in the same historical period (2016: 146). Indeed, it is not only the material invention of automated mechanisms that matters, but also the cultural implication of discipline that arrives onto the factory floor. Machinisation of production essentially is the importation of mechanical algorithms into the factory, which demands changes to the worker's body. Specifically attuned to the rhythms, the body is disciplined into one that coheres with mechanical algorithms. This brings to mind the machine-like actions of Charlie Chaplin in *Modern Times* (1936), struggling to keep up with the machine, under the watchful eye of his master.

The docility of bodies is imagined and captured in the invention of automata – on one hand a projection of ceaseless labour onto bodies, on the other a stepping stone towards technologies of automation. While the Hellbrunn Mechanical Theatre depicts docile bodies working like clockwork, the mechanised loom forces workers in an assembly line to work with its algorithmically composed rhythm – '[t]he time of each must be adjusted to the time of the others in such a way that the maximum quantity of forces may be extracted from each and combined with the optimum result' (Foucault 1979: 164–165).

## Quantified self: living with algorithms

Automata's close-ended mechanical algorithms could be seen as precursors to the complex and multifaceted digital algorithms we have today.[2] Today's algorithms have evolved beyond the mechanised counterparts and operate at micro-temporal rhythms functioning at a much faster rate than, and out of sync with human consciousness. Mark Hansen (2015) designates this as a defining feature of 21st-century media. The sensing abilities of the machines and the continuous machine-to-machine communication result in 'environmental', ubiquitous, background-running operations, which constructs a 'performative infrastructure' (Thrift 2005).[3] The performative nature of algorithms can also be identified in Luciana Parisi's work – 'algorithms are no longer or are not simply instructions to be performed, but have become performing entities: actualities that select, evaluate, transform, and produce data' (2013: ix).[4] Indeed, Natascha Just and Michael Latzer (2016) argue that automated algorithmic selection governs what could be found on the Internet, and offers metrics for scoring, ranking, and predictive analytics.[5]



Indeed, living with algorithms could impose rhythms and disciplinary standards on the body as much as the mechanised algorithms in the assembly line. We could see this deep intertwinement between algorithms and bodies in the QS movement. To illustrate this, I turn to two devices, Lumo Lift, made by Lumo Bodytech Inc., and Prana, made by Prana Tech LLC, both designed to teach and remind their users to stay in good posture (and breathe better), and offer machinic sensing in the style of 21st-century media.

Lumo Lift is a magnetic wearable one could place on a shirt close to the collarbone. The accelerometer inside measures bodily movement and whether one is leaning too far forwards or backwards. Algorithms detect if one has deviated far enough from the calibrated ideal position, and would activate the device's vibration to remind the user to adjust posture. Prana is a similar device for the waistband which collects data on diaphragmatic breathing, posture, and breath patterns. In passive tracking mode, Prana alerts the user if it detects stressful breathing or poor posture – when the user's breath is fast and shallow, when the airflow stays in the chest area rather than extending into the belly. Prana notifies by vibration or smartphone alerts. In active training mode, Prana boasts a gamified technology where one collects flowers with controlled inhalations and exhalations with a bird avatar flying through a Zen Garden. The bird will only move forward if proper posture is detected. The Clinical Mode 'provides a more in-depth timeline interface for tracking 10 distinct breath stats, posture, and displaying real-time breath patterns, as well as scoring each breath with respect to a target breath pattern' (Persidsky 2016).

Both devices use vibration as a signalling mechanism. Brad Millington refers to this as 'haptic surveillance' (2015: 1) – '[h]aptic surveillance thus yields haptic discipline: the user is not only observed through the touch, but can be "reprimanded" in much the same way' (2015: 6), bringing to mind the becoming-docile of Foucault's soldier through discipline, training, and habituation.

## Bodies under surveillance

The use of 21st-century media as disciplinary devices fits within the scope of Michel Foucault's docile bodies. While we once saw the imposition of factory discipline through mechanised algorithms, these disciplinary standards have become de-institutionalised and have gradually migrated into the domain of market and consumer goods. This follows the logic in Gilles Deleuze's Societies of Control (1992), where practices once held within the boundaries of institutions are no longer contained with one domain (the school, the prison, the hospital). The market plays a pivotal role in conveying these disciplinary standards and may entice individuals to opt for the imposition of such standards upon oneself.

QS is a perfect amalgamation of bodily surveillance and self-monitored performance based on haptic feedback, an invention that fulfils Deleuze's prediction for future technologies of power. Despite the promise of a healthier spine, the idea that individuals would actually purchase such QS devices for self-induced disciplining and durational surveillance really is biopower at its best – disciplinary standards invisibly incorporated into a product you have to pay at least US$99 for, a device that you would wear every day to monitor yourself while sharing the same data with the company (which in turn further monetises these data sets). It requires no institution (a factory, an army) to impose discipline, but is gamified into apps that teach you how to breathe better and become a more productive citizen whose labour can be better and further extracted. Lumo Life is in particular marketed to big companies as part of their Corporate Wellness programme, with Posture Education bundled into the app, recommending exercises and stretches, teaching pain management, reminding employees all the while to sit and stand taller with the device ready to vibrate should one begin to slouch in the middle of a workday.

Digital algorithms automate the process of disciplining, delivering personalised buzzes whenever necessary, demanding bodily performance. Masked behind the promise of better health, users become the docile bodies these algorithms govern over. This brings to mind Jon McKenzie's argument that performance is what comes after 'discipline' as the chief mechanism through which power operates through. McKenzie shows how the necessary technological force calls forth the potential of material resources and challenges them to perform to a particular standard for the sake of achieving better 'efficacy, efficiency and effectiveness' (2001: 171). His catch-phrase 'perform – or else' suggests a challenge embedded within the concept – 'a certain level of terror, whether soft or hard: be operational (that is, commensurable) or disappear' (Lyotard 1979, cited in McKenzie 2001:14). AuQ65 AuQ66



## Docile subjects

Juxtaposing mechanical automata with digital algorithms shows how bodies may be disciplined in different ways under the two regimes. Working alongside mechanical algorithms in a factory requires an attunement of the body to the machine, while living with digital algorithms in QS disciplines bodies through haptic surveillance. Arguably, the digital docile subject is doubly exploited – disciplined in movement, tracked for data extraction.[6] Unlike the mechanical rhythms a worker has to catch up to, the micro-temporal rhythm of digital algorithms means that we cannot perceive in real-time the extraction of bodily data. The data not only feeds back for improvement of the original algorithm, but also feeds forward (Hansen 2015:140) into other economies as the data is mined, stored, and sold by corporations, usually for advertising purposes.[7] The disciplinary power of mechanical algorithms once observed in the theatres of automata has evolved into a much more insidious form under the digital algorithmic regime. AuQ67

## Notes

1 Charles Babbage (1791–1871), who was defeated twice by the chess-playing Mechanical Turk, took inspiration from the Jacquard loom when creating the Analytical Engine and the Difference Engine. His machines are lauded as the first computers created.

2 The Mechanical Turk (Wolfgang von Kempelen, 1769) is often cited as the precursor to IBM's DeepBlue (Bloomfield and Vurdubakis 1997; Dixon 2004). Featuring an impressive-looking man in a robe and a turban, the Turk sat at a wooden cabinet with a chessboard on top, ready to play against any opponent who would like to challenge his skills. In the 1990s, this dream of automation in chess-playing has been remodelled in IBM's

DeepBlue, the first supercomputer to beat a human grandmaster. This ability is magnified by the invention of AlphaGo (2016), which has successfully beaten human opponents in the complicated game of Go. AlphaGo makes use of a neural network and machine learning to increase its computational power. See further Levinovitz (2014) and Metz (2016).

3 Erich Hörl refers to the same phenomenon as the 'technological displacement of sense (*Sinnverschiebung*)', and as a creation of an ecological technological condition (2015: 1).

4 Parisi refers to this as 'soft thought' (2013: xvii). Digital algorithms are seen as autonomous modes of being. While they are materially embedded within the actual operations of hardware and software, they also hold the potential to morph into something else beyond the pre-programmed notions.

5 'Algorithms co-govern or co-determine what can be found on the Internet (search applications, for example, what is indexed by search engines/crawlers), is seen and found (search, filtering, and aggregation applications), is produced (content production applications like algorithmic journalism), is considered relevant (search and scoring applications; ranking), is anticipated (prognosis/forecast applications), and is chosen and/or consumed (recommendation, scoring, and allocation applications; both for economic and social choices – ranging from commercial goods to friends and partners)' (Just and Latzer 2016: 247). See also Rouvroy and Berns (2013).

6 See further the digital labour discourse vis-à-vis Terranova (2000); Fuchs and Sevignani (2013); Clough (2013).

7 See further Hansen (2015: 50–55, 140–147).

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