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AMBIENT INTELLIGENT PHOTOGRAPHY

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Introduction:The politics of life after photography

The start point of this chapter is a phenomenon only recently referred to as ubiquitous photography.[1] This phenomenon can be understood by means of two related but distinct contexts that we might summarize as follows: the networked *computer* and distributed, embedded, intelligent *computing*. The substitution of one context for another – of the computer as an object with computationally-enabled intelligent or smart environments – is the goal of the still futuristic, still evolving project of ubiquitous computing. While I have explored the relation between ubiquitous photography and ubiquitous computing elsewhere,[2] what I aim to do here is to track both the goal and the evolution of the ubiquitous computing project as it enrolls photography and strives to transfer – or, as Martin Hand suggests, 'morph' – it from a context in which it is *everywhere* to one in which it becomes, in Adam Greenfield's term, *'everyware'* (Greenfield 2006: 9; Hand 2012: 12). Greenfield's synonym for ubiquity, 'everyware' is 'ever more pervasive, ever harder to perceive' and evokes a scenario in which 'computing has leapt off the desktop and insinuated itself into everyday life' (9). The key question then is what is at stake as and when computing – and its morphological designs on photography – insinuates itself into something we too blithely refer to as everyday life? So far, I suggest, our answer to this question has been rather too parochial (concerned with the fate of photography as a medium), politically naïve (as if the manifestation of photography everywhere was itself democratic, or as if the everyday was a neutral, uncontested, or even inherently politicized realm) and constrained by disciplinary boundaries unable to address the life in everyday life (as being biologically as well as socially mediated) or to respond adequately to the technology industry's seemingly all-encompassing vision.

New media studies (including 'new' new media or social media), concerned with the relation between mass media and the networked computer (Lister *et al.*

2003), has addressed the proliferation, diversification and dispersal of photography in and across private and public, amateur and professional realms. In conjunction with related disciplines[3] it has contributed to a sense that photography is no longer a discrete medium, but rather one that has converged with, or become remediated by, the computer. Just as the identity of photography as a separate medium appears to be at an end, the endurance of photographic codes and conventions is conveyed through designations such as 'post-photography' (Batchen 2002) and 'after photography' (Ritchin 2008). In *After Photography*, Ritchin modifies his earlier, rather deterministic and apocalyptic prediction that digitization would mark the end of photography as we have known it. Instead, he writes that 'photography as we have known it is both ending and enlarging' (15). Reassuring in its guise as something quite familiar, digital photography spreads like a virus, invading, Ritchin suggests, all aspects of contemporary life so that everything (everywhere) from politics to particles becomes as easy to manipulate as a pixelated image. Everything, for Ritchin, includes us: 'we are also changed, turned into potential [manipulable] image' (21). Ritchin's physicalism – his concern with the material as well as metaphorical alignment of politics, particles, pixels and people – is underdeveloped but derives from a willingness to engage the fields of technoscience (cybernetics, artificial intelligence, particle physics, genetics and so on) that is still unusual in the context of debates on photography. As a consequence, he characterizes life after photography in terms that, in my view, deserve further consideration, not least because they exceed his own preoccupation with manipulation. These terms include automation, animation, augmentation and ambience.

Photography, Ritchin suggests, becomes automated when machines offer to do it for us, 'using face recognition to remind us with whom we are talking at a party, or recording what we missed when inebriated' (163). Photography is animated by means of the tropes of liveness conveyed in part through the remediation of photography with moving images and also by the current trend towards what Geert Lovink calls 'real-time' (think Skype, video streaming or live monitoring of the Olympics) (2011: 11). What is more, the once self-contained image, at most supplemented or anchored by textual information can now be overlaid or augmented with visual, textual or aural information individually tailored to the viewer's exact location and specification.[4] Finally, the digital camera itself 'will be further absorbed into other devices' apart from mobile phones. These devices may include 'refrigerators, walls, tables, jewelry, and ultimately our skin' (Ritchin 2008:143). At this point, photography is ambient, environmental and associated with a set of discourses, I would suggest, that lie outside those of digitization, new media or indeed social media. The proliferation and dispersal of photography after photography has of course raised questions about photography theory (Elkins 2007) and led to arguments, my own included, for a more expanded and expansive discipline (Kember 2008). Crucially, this expansion exceeds an account of photography as a new, new medium: social, networked, user-based, amateur, personal and vernacular (Batchen 2002; Rubenstein and Sluis 2008; Van House 2011). The start point of this chapter, as I indicated, is that ubiquitous photography is increasingly

incorporated within the claims and innovations associated with the wider discourse of ubiquitous computing. Here, media are realigned within the terms of the technoscience industries and their quest to generate ambient intelligence (smart environments), automated systems, animated artifacts and augmented realties. In terms of its relation with developments in ubiquitous computing, ubiquitous photography is not crossing always unstable boundaries between public and private, professional and amateur realms as much as it is becoming part of a re-ordering of life (biological and social) under the cover of practices of media and communication that are deemed ordinary, everyday, user-based, personal, private and vernacular. The everyday then is a highly contested realm – a realm of biopower. In order to analyze the biopolitics of life after photography, we need to move beyond new new media studies and its preoccupation with photography everywhere in order to take account of technoscience studies of ubiquitous computing as 'everyware'.

Photography as biotechnology

Such a move was perhaps already implicit in the concept of convergence and especially of convergence as another name for remediation (Bolter and Grusin 2000). My own interest in convergence lies not so much in the relative prevalence of technological, cultural or economic forms, but in a level or degree of convergence that is largely overlooked in media, communication and cultural studies, namely that between media and communication technologies, information technologies and *biotechnologies*. Put simply, computing has long been informed by attempts to model biological forms and processes, and media have long been informed by computing. It is Donna Haraway who insists on the hegemony of biology 'woven in and through information technologies and systems' (2000: 26) and governing multiple sectors of society including, for her, health, management, intellectual property and so on; for me, media. In as far as convergence is deployed in progressive, teleological accounts of media and technology,[5] it is better to speak of the remediation of media and biotechnology in an environment constituted of 'biological and technological things' (Lister *et al.* 2003), of technologies and users and of human and non-human agents. Haraway and other technoscience theorists such as Katherine Hayles and Karen Barad are interested in the entanglements or dynamic intra-actions that constitute posthuman agencies and contradict the autonomies, or what I call (after Bergson) 'false divisions', that characterize humanism and its manifestation in media studies, new and newer (Barad 2007; Hayles 1999). For Barad, 'existence is not an individual affair' and 'to be entangled is not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence' (2007: ix). Entities such as technologies and users do not therefore interact – as this presumes a prior separation – but rather, intra-act where intra-action 'signifies the mutual constitution of entangled agencies' (33).

The entanglement of technologies and users belies the false divisions that persist through new, social and what is sometimes referred to as cross media. If cross media designates a primarily technologically-driven phenomenon whereby content

is delivered across a range of different platforms,[6] social media, associated with Web 2.0, somewhat over-emphasizes the autonomy of media use and users. Lovink refers to social media as 'networks without a cause', or networking for the sake of networking, photo and file sharing for the sake of sharing (2011). He suggests that this purposeless proliferation of digital communication obscures not only continuities of predominantly commercial interest but, more specifically, an enhanced and renewed investment that is far from user-centric, participatory or bottom-up. 'We should judge Web 2.0 for what it is', he says: 'a renaissance in Silicon Valley which nearly vanished due to the 2000–2001 financial crisis, the political reorientation of G.W. Bush's election, the 9/11 attacks and successive US invasions in Afganistan and Iraq' (4). In order to gain a hold on the market, internet start-ups needed to change their approach from 'quick and greedy IPOs (flotation on the stock market)' to what Jenkins calls a 'participatory culture' in which 'users (also called prosumers), and not venture capitalists or bankers, had the final say' (4). The resultant freer and more open business models, Lovink suggests, repackaged or revised the attitudes of the past without any real change in the balance of power and profit. User-generated content 'aggregates profiles that can be sold to advertisers as direct marketing data' allowing companies to profit 'through the control of distribution channels' while users remain largely unaware of how 'their free labour and online socializing is being monetized by Apple, Amazon, eBay, and Google' (5). Currently, Lovink writes '*as the IT sector takes on the media industry*, the cult of free and open is nothing more than dubious revenge on the e-commerce madness that almost ruined the internet' (5) [my emphasis].

If, for Lovink, we remain lost (pointlessly) in MySpace, Twitter, Facebook and Flickr we cannot, in my view, find our way out through a critique or rejection of social media alone. The point *is* that the IT sector or technoscience industries are taking on the media industries, incorporating them in ways that are utterly asymmetric and exploiting our agential intra-actions, or dynamic relations with technology in order to derive value from them. Where Lovink is right to argue that the strategy of the technology industries is to revive and repackage e-commerce, the point he misses is that they do so by making direct claims on the everyday and on social environments constituted by users and intelligent artifacts alike. Such claims have come from research in ubiquitous computing and they materialize through new discourses and innovations that, by means of the media and technologies of (everyday) life, seek to change the very meaning of it. One such discourse is ambient intelligence, a hybrid of ubiquitous computing and artificial intelligence that is already evolving its own version, its own vision of media.

Ambient intelligent photography

Ambient intelligence (AmI) is, as Marc Böhlen points out, 'still a comparatively new field of research' (2009: 1). For Stefano Marzano it seeks to become a different kind of artificial intelligence or 'an AI that could soon form a natural part of our everyday lives' (2003: 8) and for Emile Aarts and co-authors, it remains continuous

with Mark Weiser's ubiquitous computing project of replacing computers with computing and placing the user centre-stage:

> After fifty years of technology development for designing computers that require users to adapt to them, we must now enter the era of designing equipment that adapts to users.
>
> *(Aarts, Korst and Verhaegh 2004: 4)*

User-centrism is about user-friendly computing that connects ordinary artifacts and things in familiar environments such as the home, city, transport, shop, airport and clothing (8). An environment that is ambient *intelligent* can recognize its inhabitants, adapt to them, 'learn from their behavior, and possibly show emotion' (6). Incorporating elements of research in affective or emotional computing and embodying the key features of embeddedness, context awareness, personalization, adaptation and anticipation, the overall vision of ambient intelligence is of a form of computing that is chastened, servile and very much about 'you' as an individual user. A prevalent metaphor of the ambient intelligent artifact has been that of the butler (Aarts *et al.* 2004; Suchman 2007). However, as this still-new field has continued to develop, the metaphor has shifted from the butler to the nurse. This has happened in conjunction with the development of research in ambient media, or rather with the expansion of ambient media from the context of advertising to that of assisted living and health-monitoring. As Bogdan Pogorelc *et al.* reveal, ambient media 'is the name given to a new breed of out-of-home products and services' (2012: 340). Research funded by the European Union aims to 'enhance the quality of life of the elderly, release the burden on the supporting population, and strengthen the industrial base in Europe' (340). Funding is motivated and justified by 'demographic changes, in particular the ageing of the European population, which implies not only challenges, but also opportunities for the citizens, the social and healthcare systems as well as industry and the European market' (340). Alongside social media and the wider field of ambient intelligence, ambient media articulate and disarticulate, avow and disavow the entanglement of life and capital. As new forms of profit accrue from our being, becoming and behaviour online and at home our environments are increasingly naturalized by means of invisible, embedded computing and intimate, agential, emotional technologies personified as butlers and nurses. 'On a larger scale,' Pogorelc *et al.* write, 'the field of ambient media defines the media environment and the communication of information in ubiquitous and pervasive environments' (340). Key to this communication is the 'interaction [sic] between people and machines' facilitated by more affordable (if not yet more efficient) sensors, actuators and processing units (340).

If there is a general level of awareness that 'cars now have dozens of sensor and actuator systems that make decisions on behalf of or to assist the driver' there is perhaps less awareness that 'public spaces have become increasingly occupied with tracking devices which enable a range of applications such as sensing shoplifted object [sic] and crowd behavior monitoring in a shopping mall'

(Nakashima *et al.* 2010: 4). Ambient intelligent environments are sensory environments and they attempt to become more user-centric by diverting attention away from themselves to the services they are able to provide. This goal has necessitated the development of something called middleware. Middleware is an operating system that connects sensors and actuators and enables seamless communication between devices and users:

> For context-aware computation, some of the context information such as location, time, temperature, etc. must be handed over to application software modules in some predefined format. To accomplish this, data conversion and even data fusion from many different devices must be handled by the middleware.
>
> *(Nakashima* et al. *2010: 10)*

Middleware mediates[7] between users of services and applications and sensory rich environments and constitutes a new computing infrastructure making it possible to 'hide the complexities in ambient intelligent environments' (11). Those same environments are also increasingly augmented or overlaid with information, and while this overlayering might seem contrary to the creation of naturalistic, invisible and embedded computing, it is actually quite consistent with it. The idea is that mobile augmented reality (AR) browsers should be able to provide 'convenient real-time processing of web-based information that the user perceives *through* the phone, rather than *on* it' (Jackson *et al.* 2011: 410). The effect, as Jackson *et al.* see it, is to effectively be able to walk through information and engage with it more intuitively (410). This vision, based on directing camera-equipped devices at cinemas, road intersections, guidebooks and so on and being able to engage as it were directly with show times and film synopses, live traffic information and animated photographs of tourist spots, finds its apogee in MIT's project to develop sixth-sense technology. If AR, facilitated by camera-equipped mobile phones, head-mounted display units or Google's goggles refuses to be limited to the sense of sight and 'can potentially apply to all senses, augmenting smell, touch and hearing as well' (Carmigniani and Furht 2011: 3) then sixth-sense technology attempts to access something like intuition itself[8] understood as the totality of data, information and knowledge that has been collectively accumulated online. The means for doing so, while actually comprised of a specific set of miniaturized off-the-shelf technologies – a webcam, mirrors, a smartphone and a micro-projector hung from a lanyard worn around the user's neck – appears to be the user's body itself. The sixth-sense device 'recognizes the movements of the user's hands via the webcam (and colour-coded finger-gloves worn on index finger and thumb) enabling gesture-commands like the classic "frame" gesture which makes the device snap a photo'.[9] Although it is the device that takes the photo, it seems like it is the photographer's fingers and in this sense, sixth-sense technology strives to fulfill what for Bolter and Grusin is the (apparently universal) desire for immediacy (2000), and for me is a more top-down quest to make media and technological

objects disappear into ambient and augmented environments that are increasingly constituted as smart – or that reconstitute smart as something that is user-friendly, serves us rather than supersedes us and is ultimately ordinary.

From AI to AmI: contesting the quotidian

In earlier forms of technoscience, notably artificial intelligence (AI) and artificial life (ALife), smart was constituted as something extraordinary, likely to generate successor forms of intelligence and life that, at least in the popular imagination, turned out to be markedly unfriendly. AI, the attempt to programme intelligence into machines as it were from the top-down, focuses on expert systems and, historically, framed intelligence in terms of the ability to speak. A short film on Youtube entitled 'AI vs AI' is testament to sentiments such as those of Hubert Dreyfus that the ability to speak does not necessarily imply that the speaker has anything particularly interesting – or intelligent – to say (1999). Lucy Suchman similarly examines her dialogue with Stelarc's head – an AI simulation – and finds it engaging only to the extent that it is largely nonsensical (2007). The icon of AI in popular culture is Hal 9000 in *2001: A Space Odyssey*. This spacecraft-flying, chess-playing, softly-spoken companionate computer turns notoriously nasty, turning off life-support systems, jetisoning Frank into deep space and refusing to open the door and let Dave, who has retrieved Frank's body, back inside the craft. The story of Hal, his actions and their consequences, and particularly the calculated and treacherous 'I'm sorry Dave, I'm afraid I can't do that' struck fear into a generation of computer scientists and was instrumental in signaling the failure of AI and the subsequent emergence of ALife (Kember 2003; Stork 1996). For ALife engineer Steve Grand, Hal's expertise proved to be not inadequate but irrelevant as the complex demands of the mission demonstrated his lack of flexibility as well as friendliness. As he put it, a computer may be able to beat a mouse at chess, but try throwing them both in the water and see how they get on (in Kember 2003). ALife proposes that flexibility might be acquired by embodying and situating intelligence and by allowing it to grow or evolve from the bottom-up rather than trying to programme it – when we don't even really know what 'it' is. I have argued that ALife is a revisionist form of AI rather than a replacement for it. If its methods are different, its goals are fundamentally similar and, significantly, it seeks to achieve them by adapting to critiques of AI that came from both inside and outside the field. Where AI is top-down, ALife is bottom-up; where AI is based on command and control principles, ALife, in contrast, is based on the principles of 'nudge and cajole' (Grand in Kember 2003). If AI is masculinist and disembodied, ALife can be positioned as feminized and re-embodied, thereby addressing an epistemological and political intervention similar to that faced by the field of sociobiology. Such revisionism or adaptability raises questions about modes and methods of critique, which I will address later on and that include genealogy as a way of tracing not only the nonlinear story of the technosciences but what might be at stake in its telling.

The icon of ALife in popular culture is the unspeakably saccharine David in *AI*. David is a robot who loves and who honestly believes he is a real boy. Suchman examines the tendency towards mimicry and anthropomorphism in human-computer interaction (HCI) and highlights the paranoid master/slave narrative that traps our relationship to machines in an endless cycle of love and hatred, friendliness and enmity. I have argued that this potential for paranoia is heightened not reduced by the apparent shift or downsizing in the technosciences from claims to artifice to those of ambience and augmentation.

If AI fails in part because we don't know what intelligence is (thus making it difficult to programme in to hardware or software) then ALife fails in part because there isn't, and arguably never will be, any agreement as to what exactly life is. Attempts to generate humanoid artificial life never actually managed to scale up even as far as ant-like artificial life. In this context, Grand's achievement in getting his robot baby orangutan to distinguish between an apple and a banana is not to be underestimated (Kember 2003). The technosciences of artifice were and remain highly hubristic and what is interesting in the story of a shift from artifice to ambience is the apparent, but not actual, relinquishment of hubris and/or its all too apparent consequences. As the lofty, even metaphysical goals of AI and ALife – to grapple with the meaning of intelligent life and ultimately reproduce it – fall flat, we witness a recourse to the quotidian courtesy of the developing discourse of ubiquitous computing and specifically its manifestation as AmI. AmI continues to employ the psychological principles of AI and the biological principles of ALife. Specifically, it continues to mobilize a notion of intelligence, albeit one transferred from a single machine entity to a machinic environment populated by animated and emergent (learning, adapting, evolving) artifacts whose status as artificial life forms is rendered secondary to their desire to serve us and to reassure us of our sovereign ontology and individual identity. If AmI's servility is rendered through embodied and conversational agents that may take the form of a software butler[10] or a robot nurse, its ability to reassure us comes courtesy of what Cass *et al.* call 'intimate media' (2003).

The photographic lies at the heart of intimate media

In 'Intimate Media: emotional needs and ambient intelligence' John Cass, Lorna Goulden and Slava Kozlov enrol digital photographic practices into ambient intelligent environments that enable – and oblige – us to self-build. Factors contributing to the process of self-building include memory, evoked through 'collections of objects', storytelling and the nurturing of relations within a network (2003: 219). Evoking Maslow's hierarchy of human needs,[11] the authors suggest that objects such as networked photographic images address the (again, presumably universal) need 'to represent roots and heritage, to create a sense of belonging and connectedness and to demonstrate personal identity and achievement' (218). In conjunction with other objects and artefacts of ambient intelligence, the networked image constitutes an 'extended self' and a 'cycle of self-reinforcement' that

crisscrosses online and offline space and helps to ensure a feeling of being 'at home in the world' (220). From a more critical perspective, Suchman also points out that 'smart' devices are the current expression of a long-standing dream of artifacts that know us, accompany us and ensure that we are always 'at home' (2007: 206). Intimate media that 'can also be animated, or given behaviour' – such as avatars, or embodied conversational agents – offer to serve, comfort and protect us from a hostile world (2003: 222 and Suchman 2007: 213). While enabling and/or obliging us 'to maintain an almost constant low level of communication', the apparently humanistic cycle of self-reinforcement has the capacity for autonomy or the sort of machine-machine relationality that transforms and re-orders individual subjects as data objects within what David Lyon refers to as integrated systems of surveillance and marketing (Cass *et al.* 2003; Lyon 2008). Within systems of intimacy and also geolocality, it is not just a question of linking information to individual users but rather of individual users becoming information within a self-regulated economy of information exchange. In its simultaneous making over and metamorphosis of the individual, AmI's hubris may even be of a different order to that of its predecessors.

The photographic lies at the heart of intimate media and also what Francesco Lapenta calls geomedia:

> Geomedia are not new media per se, but platforms that merge existing electric media + the Internet + location-based technologies (or locative media) + AR (Augmented Reality) technologies in a new mode of digital composite imaging, data association and socially maintained data exchange and communication.
>
> *(2011: 14)*

Referring for example to Google Earth, Google Maps, Layar and Photosynth,[12] he posits the emergence of a new genre of photographic mapping that exchanges the principle of indexicality, based on the single image 'taken at a specific time, in a specific place', for one of geolocality derived from a composite, synthesized image 'that merges different times and connects contiguous spaces' (17). Virtual maps, Lapenta suggests, at once underline the realist claim of photography and challenge it, by 'transforming a physical relation, that between the image and the object of its representation, into a cognitive relation' in which the real-world object – a street, a square, a town, a building – is always already presented as an image on the map (18). Significantly, for Lapenta, the virtual photographic map answers to the dilemma of what Frederick Jameson refers to as 'cognitive mapping', or the attempt by subjects to create meaningful representations out of an unrepresentable totality of events and experiences (1991). If Lapenta recognizes this 'projection' or 'realisation' of the cognitive mapping dilemma as being rather utopian, I would seek to characterize it as defensive and compensatory because its guiding principle is one of the impossibility of representation. Virtual photographic mapping is therefore an expression of an ongoing quest – associated with both photography and cartography – to represent the unrepresentable and map the unmappable. As

an expression of what Borges refers to as 'exactitude in science', it is an absurdity that is arguably more productive than it is nihilistic, generating rather than absorbing terrain[13] that is increasingly ordinary, and helping to constitute the everyday lives of 'the new generation of cartographers' and photographers (18). Geomedia enable individual users to 'navigate their social worlds', manage complexity and create reassurance out of anxiety. In other words, they function as forms of self-regulation:

> Along with traditional search engines (the regulatory systems of WEB 1.0) and social networking sites (the social organizational tools of WEB 2.0), geomedia provide one more tool to link and navigate the geosphere and the infosphere for data relevant to the subject and his or her relevant others in a live and continuous exchange of information.
>
> *(2011: 21)*

This live and continuous exchange of information literally incorporates the 'physical reality' and 'digital identity' of the individual and ensures that we suture ourselves in to the environment of real-time media we otherwise prosume.

If intimate media and geomedia constitute the parameters of ambient intelligence as 'everyware' (ever more pervasive and ever harder to perceive) then Greenfield urges us to be aware of limitations that may be severe enough for us to assert that everyware is currently nowhere in particular (Kember and Zylinska 2012). Notwithstanding the existence of portable devices with wireless internet access, cars and phones with GPS technology, Radio Frequency Identification Devices (RFIDs are forms of tagging products and potentially people), a host of online monitoring and tracking devices, biometrics such as iris and face recognition plus of course an increasingly available range of sensors, we still, Greenfield pointed out in 2006, have a problem in the form of a lack of public awareness and demand. How interesting then, that more recent developments, including in the direction of ambient media, have taken this problem to heart. Pogorelc *et al.* associate demand for everyware technologies with the requirement to manage an ageing population:

> Because of increasing numbers of elderly people and not enough younger people to take care of the elderly, AAL [ambient assisted living] systems to support the independent living of the elderly … are not only acceptable, but necessary.
>
> *(Pogorelc* et al. *2012: 342)*

The individualization of responsibility in a number of contexts, including health care, is of course consistent with neoliberal rationality and is manifest in policies of decentralization and privatization. Juan Carlos Augusto describes how governments are moving away from 'hospital-centric health care' towards care in the community and at home. The smart home is an example 'of a technological development which facilitates this trend of bringing the health and social care system to the

patient as opposed to bringing the patient into the health system' (2010: 2). Similar demands are expected in the context of public transport and the use of, for example, GPS and vehicle identification technologies to regulate traffic flow; education – 'education-related institutions may use technology to create smart classrooms where the modes of learning are enhanced'; and emergency services and manufacturing. In addition to using RFID tags to track products and their uses, companies are showing interest in smart offices geared to enhanced efficiency (9). This might be enforced courtesy of webcams and other technologies of surveillance but also, as the *New Scientist* has recently discussed, through the doubling or duplication of the employee-as-avatar:

> In the past year or two, Apple has filed a series of patents related to using animated avatars in social networking and video conferencing. Microsoft, too, is interested. It has been exploring how its Kinect motion-tracking device could map a user's face so it can be reproduced and animated digitally. The firm also plans to extend the avatars that millions of people use in its Xbox gaming system into Windows and the work environment.
>
> *(Adee 2012: 40)*

Animated, and indeed automated avatars need not be bona fide AIs let alone ALifes provided they can fulfill specific low-level tasks. Future, or what Böhlen calls second order AmI combines and reformulates the goals of earlier technosciences, revealing more of the market values that always already underlined those of metaphysics. Significantly, the market is seen to be threatened by increasing public awareness of privacy infringements and the ongoing internal revision and reform of technoscience is now focused on this:

> Sensitive private data about our habits and illnesses can be accessible to groups of people who are eager to take profit of that knowledge. Users will become more and more aware of this and extra measures have to be provided to bring peace of mind to the market. If the market is label [sic] as unsafe by the users then all those involved will lose a fantastic opportunity …
>
> *(Augusto 2010: 10)*

The technosciences of ambience and augmentation regenerate hubris in their attempts to denounce it, going beyond the technological embodiment of intelligence and life to the animation and automation of sense (including sixth sense), self and the social environment. The characterization of identities and environments as quotidian, ordinary and everyday is an attempt (at times thinly veiled) to depoliticize the interventions and transformations made by an increasingly marketized, residually metaphysical set of discourses and practices. The following section will look more closely at how contemporary technoscience enrolls photography after photography, re-cognizing and reconstituting it within animated and automated systems made vulnerable by virtue of their own (hidden) hubris.

Re-cognizing photography

Face recognition technology is fundamentally photographic

Face recognition technology (FRT) can be understood with reference to both intimate and geomedia, AmI and AR and is, moreover, fundamentally photographic. As such, it provides a case study into how to think of ubiquitous photography as more than everywhere and to re-cognize or rethink it in relation to the claims of 'everyware'. The question we can address here pertains to what photography after photography is becoming within – as part of – an integrated system of marketing and/as surveillance. The first thing to note is that this system implements photographic codes and conventions that were established in the nineteenth century and associated with disciplinary institutions such as prisons, schools, hospitals and asylums. There is a marked continuity between nineteenth, twentieth and twenty-first century photographic mechanisms of surveillance and control – mechanisms within which photography itself becomes consolidated as a targeted yet ultimately elusive (id)entity superseded by systems deemed to be intelligent.

FRT, along with other biometric technologies such as iris scanning or fingerprinting, stakes a claim to indexicality: the symbolic presence of an object (eye, finger, face) in an image. In the case of FRT, the image is twice removed from the object. It is a photograph of a photograph – a digitized digital image of a face. The aim of FRT is to identify or recognize someone from either a still or video image. This image is referred to as a probe image. Once it has been acquired, the system seeks to detect the face by distinguishing it from its surroundings. This is more difficult than it sounds since a computer has no inherent knowledge of what a face actually is. Consequently the system targets the components of a face; features such as the nose, eyes and mouth. The particular cartography of these features is then compared with those available within a database. Alternatively the system generates standard feature templates composed of averages or types. Once detected, the face, or rather probe image, is normalized in terms of lighting, format, expression and pose. Since the normalization algorithm can only compensate for slight variations, for example in expression, the probe image has to be 'as close as possible to a standardized face.'[14] This already standardized image of a face is subsequently translated and transformed into something called a biometric template, which should have enough information to facilitate face recognition, understood as the ability to distinguish one template from another without creating the sort of 'biometric doubles' that produce false positive identifications. Within FRT at least, one digital doppelganger is considered quite enough and two is a signal of system failure.

FRT is consistent with the earliest criminal identification system devised by Alphonse Bertillon. This, as Allan Sekula points out, employed statistics (along with a discriminatory social law of norms and deviants) as a means of supplementing and organizing a growing archive of photographic images. Photography then, as now, could not secure the identities of criminals, requiring additional verbal,

anthropometric and statistical information. For Sekula, the authority of Bertillon's system rested not on the camera but on a 'bureaucratic-clerical-statistical system of "intelligence"' (1986: 16). This system has been updated ever since and notably via the first computerized identification systems used towards the end of the twentieth century. Designed to assist eyewitnesses, these were based on two forms of coding. Geometric coding was a technique based on measuring features from images and is still very much the basis of FRT. Syntactic coding was based on descriptions rather than measurements of faces and attempted to systematize witness observations about the size, colour and shape of features. This proved difficult and arduous for the witness, as an image was built up feature by feature. The outcome was often witness fatigue followed by a failure of identification. Significantly, the effectiveness of these systems was questioned at the time but did little to interrupt production motivated predominantly by market forces (Kember 1998). Twenty-first century systems carry this legacy of technologically limited (and politically problematic) ways of seeing. Demand for them has, if anything, increased, due in no small part to the events of 9/11 and a desire to rationalize them through targeting, tracking and location systems such as FRT. The problem of witness fatigue and failure that had marred earlier systems was exemplified in the narrative of 9/11 (Lyon 2008) and since then, the role of the eyewitness has been slowly eliminated from systems that are increasingly automated.

Even though it was based on anthropometric measurements of the individual, Bertillon's system related the individual to the group by establishing statistical/social norms and deviants. FRT functions in a similar way, whether the context is institutional or commercial, classifying and segregating individuals into groups and types depending on their appearance as an indicator of behaviour, and evincing a form of biopolitics[15] that is no less effective for being more at a distance, more user-friendly or ever harder to perceive. FRT as a system of what Kelly Gates refers to as 'mass individuation' (2011) is still essentially Bertillon's, but in addition, an algorithm used in FRT produces images that are strangely familiar from Francis Galton's eugenicist composites of the nineteenth century. It does so by removing extraneous information and decomposing faces into standardized types called eigenfaces[16] (Figure 4.1).

Another algorithm generates classes of faces, rather as Havelock Ellis did in his physiognomy of criminals (Figure 4.2) (1901). Outmoded beliefs and prejudices[17] are sustained by the persistence of ways of seeing that surface in times of crisis – producing for example the racialized 'face of terror' – and then submerge into the seemingly innocuous, depoliticized sphere of everyday life where faces are in fact big business and subjects re-order themselves as they are re-ordered as data objects for markets.

The technological limitations of FRT as a total machine (Tagg 1989) offer one opportunity for critical intervention. The limitations range from failure due to poor lighting, non-standard viewing angles (frontal and profile remain the only viable ones), obstacles such as facial hair and glasses, low image resolution and expressions in excess of the average mug shot. Nevertheless, the system as a whole – comprised as it is of technologies and users, images, infrastructure, investments, expectation

FIGURE 4.1 Eigenfaces. Image copyright FaceAccess at Cornell University.

FIGURE 4.2 Linear Discriminant Analysis from 'Boosting Linear Discriminant Analysis for Face Recognition' by Juwei Lu, K.N. Plataniotis and A.N. Venetsanopoulos. © IEEE 2003.

and belief – remains highly productive. What does it produce? FRT produces faces as quasi-objects, at once detached from, and conflated with, bodies that are, in turn, detached from and conflated with identities. These faces are literally recoded as static photographic images, fixed in the nineteenth century and wrongly divided by Sekula into categories of honorific and repressive. Now, as ever, those categories dissolve into each other, making mug shots of us all. FRT also produces the ongoing history of photography as an imaging technology entangled with others and now enrolled into ambient 'intelligent' systems. These systems in turn re-cognize, rethink what photography is, specifically by distancing, digitizing and hybridizing it, and turning it, finally, into the kind of elusive identity (like that of the criminal and consumer) it still strives to represent.

Conclusion: After photography theory

How do we approach photography after photography without recourse to parochialism and pathos (wither photography?) or indeed a sort of perverse progressivism whereby we reluctantly accept the determinists' celebratory rhetoric of substitution: the substitution of the camera by computing or of the image by the algorithm. I do not propose to swap or substitute photography theory for technoscience studies even though the latter is now, I hope to have established, indispensible to understanding the current ubiquity of a medium that is no more, or rather that is more dynamic, more engaged in boundary work than ever before.

It is this question of dynamics, of entanglements that are never quite complete and that produce entities – including cultural forms – that are contingent and never discrete that leads me to wonder whether 'theory' is simply too sluggish to account for modes and methods of critique that might be considered fit for purpose. This kind of quandary is of course not new. It is integral to all areas of theory, not least photography theory, as it searches within and at times even outside of itself for a solution (Elkins 2007). Debates on new and social media have at times fallen into the substitution trap, for example, of media studies by software studies (Manovich 2001; Lovink 2011) where philosophy – though by no means a destination in itself – is more deft at handling the quandaries of knowledge per se, but also knowledge as it relates to what we call, in this context, everyday life. Bergson, for example, argues that intuition, or more specifically, an intuitive method, might enable us to reconnect knowledge with what it is trying to know because not only does it enable us to ask better questions (and think more clearly about how things are really distinguished from other things) *it is also more dynamic,* more attentive to time understood, by him, as creative evolution (Bergson 1998; Deleuze 2002). Not only does intuition enable us to get dynamics in a way that our Cartesian, intellectual habits of mind do not,[18] for Bergson it requires modes of communication that are in themselves more dynamic, more rooted in images rather than just ideas, in stories as much as science. This kind of philosophy finds its way through contemporary feminism where, for example, Rosi Braidotti asks us to consider a mode of communication that is less reliant on rigid off the peg categories and concepts of

thought (humans and machines, technologies and users) and therefore more attuned to the complex entanglements around us and of which we are a part (2002). This seems to me to be more important than ever as the media environments that we co-constitute are being named and claimed by the technoscience industries.

Rather than worrying about the efficacy of theory, perhaps we should start (as Bergson suggests) by asking ourselves what we think the problem is. For Bergson there are true and false problems, and even lacking his epistemological and ontological certainties, I wonder whether the fate of photography as a medium isn't something of a false problem masking the 'true' or truer, or better problem of the role of photography and the photographic within systems of ambient intelligence that might be construed as dynamic in various ways. FRT, for example, contributes to the constitution of faces as photographs. Characteristic of this and other biotechnological systems is a tendency to adapt and evolve in such a way as to contain threats to the system itself. Such a tendency is not natural but rather naturalized. Think about face distortion software, which codes for what the system seeks to eliminate or, through automated expression analysis, reduce to more standardized templates. Then think about Apple's Photo Booth that encourages you to select your distorted face from a safe set menu that includes – literally in the center of the screen – the 'normal' face. So you can have a distorted face as long as it conforms to certain effects (stretched, twisted, squeezed, etc.) that have already been prescribed. The market is the means and the motivation for containing face distortion or, if you like, for delimiting the possibilities of what faces can be. Faces stand for identities in FRT, and specifically for the axis of criminal and consumer. The containment of identity within biotechnological systems that open out the possibilities of identity illustrates what I've called the central paradox of the biotechnologies, which is, increasingly, the new (meaning additional) paradox of photography. While it continues to appear to be a message without a code, photography plays its part in coding everyday life and everyday lives as we know them rather than everyday life and lives as they could be. The re-orderings of subjects as data that remain very much at stake here are, as I've suggested, hidden acts of hubris that speak to the *potential of capital alone*. That is to say, that the potential of capital is realized by harnessing life in a double and paradoxical way that embraces change in the form of continuity.

How do we (out) face photographic configurations of capital, technology and life that are generative but not progressive, evolving but not becoming?[19] What modes and methods of critique might be considered fit for purpose? Without turning from photography to technoscience theory (and this chapter has used elements of both), how do we get close enough to the dynamics of ambient intelligent photography to understand and intervene? This last question is a loaded one, always already informed by feminist methods and modes of critique across disciplines. Feminist philosophy and science and technology studies, in particular, have given us the concept of figuration; the use of an image-idea such as the cyborg or nomadic subject as a means of both critiquing and re-imagining a

specific field such as cybernetics and the worlds it threatens or promises to make. Haraway's project of re-worlding through figurations is ongoing and underpinned not only by the use of the specific image-idea but more broadly by her sense of the alignment of technoscience and storytelling (in Gane 2006).

If ambient intelligent photography is an instance of technoscientific storytelling, then to what extent can that story be retold? It helps to recognize that any possible retelling (meaning different telling) might be aided and abetted by the inherent un-telling of the story within technoscience itself. Derrida gives us the concept of dissention that describes the internal revolutions, the contradictions, 'the gaps and fissures' that, in the context of ambient intelligence, Crang and Graham rightly identify as a point of intervention (Derrida 1978; Crang and Graham 2007). How might we characterize these dissentions? I've already indicated some characteristics, but broadly, they might include: the non-homogeneity of the field; principle technological limitations; hubris and hubristic absurdity plus an all-too evident inability and, at times, unwillingness to disentangle fact from fiction. In the lead article for the new *Journal of Ambient Intelligence and Smart Environments*, Marc Böhlen effectively demonstrates all of these attributes. He starts with an anecdote:

> I recently visited a smart house that has wall to wall voice control to activate curtains and open windows. Speech recognition is notorious for its unreliability in noisy environments and unconstrained vocabularies. The proud home inhabitant, hired by a company to demonstratively live in this smart house, used a microphone headset in an attempt to keep the signal to noise ratio between his voice and the inevitable background noise at a level the voice recognition system could cope with. The system designers were well aware of the potential of miscommunication between speakers and voice activated control systems, and added an additional level of robustness in the usage scenario. Each voice command was preceded by a signature prompt that cued the listening system to the incoming command. The signature prompt was cast into a form of addressing people are fAmIliar with: a name.
>
> *(Böhlen 2009: 1)*

The presenter, Böhlen goes on, had to repeat various commands during his demonstration. Each command 'was preceded by the house name as if he were calling a disobedient dog'. Moreover, audience participation, and perhaps some rather unhelpful comments just made the situation worse. 'The window shades opened and closed out of sync not unlike the gadgets in the Villa Arpel of Jacques Tati's *Mon Oncle*' (1). Non-celebratory science-fiction also has its role here (think of Douglas Adams' obsequious lift or, better, Phillip K. Dick's libelous door that demands cash for opening and threatens to sue you if you can't or won't pay),[20] helping to ensure the non-inevitability of the field with which it is inextricably bound. What's more, AmI researchers, with their absurd designs on 'fAmIly' life, are themselves writing science-fiction and not even always by another name. Having acknowledged that there are critiques of AmI, not least 'vis-à-vis ubiquitous surveillance technologies',

Böhlen offers us a discussion geared toward overcoming them. He does so in the form of a 'short story on the future of ambient intelligence' (2). This highlights better sensors, better algorithms and fewer false positives of the sort that plague FRT systems. Future photographic 'facial emotion recognition systems will be able to distinguish between subtle expressions' and 'the clownesque facial distortions of anger, fear and pleasure that machine vision can detect today will be material for comedy shows tomorrow' (2). Böhlen seeks to circumvent both hubristic absurdities and failures, returning what he calls second-order AmI to AI and to ALife with its inherent interest in other species. Where ALife researchers longed to study alien life forms but settled for generating their own in software, better sensors 'that can see beyond our limited visual spectrum and listen in on audio signals far beyond our own limits' should 'allow us to watch out for alien life forms in remote places' and also 'watch and listen to life forms in our own AmI backyard' (4).

Böhlen's contribution to the future of AmI reminds us of the importance of genealogical methods that for me are always feminist genealogies, alert to the particular gender ironies of AmI's – as of ALife's – designs on emotional and social intelligence. Just as ALife failed to scale up from insect to humanoid intelligence, AmI struggles to scale up from one to many smart home users: 'Funny examples are known where systems were not prepared for the complexity of a user having a pet wandering around the house triggering sensors here and there' (Augusto 2010: 11). This helps to put plans for ambient assisted living into perspective, and as for fAmIlies:

> consider for example a family living under the same roof and a system that tries to provide services for all them [sic]. Choosing a T.V. program may be a situation of conflict, should the system stay away from such domestic rows or should it have a duty to advise and mediate? How the system should react when there are irreconcilable positions?
>
> *(Augusto 2010: 11)*

How indeed.

Notes

1 See Hand (2012) and Kember (forthcoming).
2 Kember (forthcoming).
3 Such as visual cultures and photography theory.
4 See the Layar app for example.
5 Such progressive accounts are evident in government white papers, but also in technologically deterministic academic texts such as, for example, Manovich (2001).
6 See http://en.wikipedia.org/wiki/Crossmedia#Further_reading. This is a designation that belongs primarily to industry while academic research is more focused on notions such as x reality, referring to media that cross online and offline realities (see Coleman 2011).
7 Here I use the term mediation in the conventional sense, i.e. in which media and technology function as a third party or mediator. However, all such functioning is

non-innocent and non-transparent, meaning that the process of mediation is agential and co-constitutive of the entities or events that are mediated (Kember and Zylinska 2012).

8 Although note that for Bergson intuition is not a sense but an atrophied form of non-intellectual knowledge (Deleuze 2002).

9 Kit Eaton 'MIT's 6th Sense Technology Makes Reality Better', *Fast Company*, May 2, 2009 www.fastcompany.com/blog/kit-eaton/technomix/mits-sixth-sense-machine-makes-reality-better

10 Suchman discusses (www.) Ask Jeeves.

11 Maslow (1987).

12 Layar is an augmented reality app and Photosynth synthesizes images from different sources in order to supply a virtual map of an object or area.

13 Baudrillard relates his nihilistic view of the absorption of events by media to a one-paragraph short story by Borges in which the cartographer's map exactly covers terrain it is mapping (Baudrillard 1983; Borges 1999).

14 Lucas D. Introna and Helen Nissenbaum, *Facial Recognition Technology. A Survey of Policy and Implementation Issues*, New York University, the Centre for Catastrophe Preparedness and Response, www.nyu.edu/projects/nissenbaum/papers/facialrecognitionreport.pdf, p. 16.

15 See Foucault (2008). Biopolitics describes the operation of power at corporeal levels including those of the individual and social body. For Haraway, Foucault's sense of the biopolitics of populations 'has not gone away, but it has been reworked, mutated, trans-ed, technologized and instrumentalized differently' so that we need to think more of something she calls 'technobiocapital' (Haraway in Gane 2006: 148).

16 National Science and Technology Council (Committee on Technology, Committee on Homeland and National Security, Subcommittee on Biometrics), *Face Recognition*, www.biometrics.gov.

17 Based on the quasi-sciences of physiognomy and phrenology.

18 See both Barad (2007) and Bergson (1998) for a critique.

19 In *Creative Evolution* Bergson aligns becoming with his concept of creative evolution (non-mechanistic, open-ended, with no apparent purpose or utility). But he counterposes this notion of creative evolution with something more conservative; a form of evolutionism that I'm alluding to here as a strategy of what Haraway would call 'technobiocapital' (see note 16).

20 Adams (1981), Dick (2004).

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