

## REVIEW

# Biometric privacy protection: What is this thing called privacy?

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## Abstract

We are at the wake of an epochal revolution, the Information Revolution. The Information Revolution has been accompanied by the rise of a new commodity, digital data, which is changing the world including methods for human recognition. Biometric systems are the recognition technology of the new age. So, privacy scholars tend to frame biometric privacy protection chiefly in terms of biometric data protection. The author argues that this is a misleading perspective. Biometric data protection is an extremely relevant legal and commercial issue but has little to do with privacy. The notion of privacy, understood as a personal intimate sphere, is hardly related to what is contained in this private realm (data or whatever else), rather it is related to the very existence of a secluded space. Privacy relies on having the possibility to hide rather than in hiding anything. What really matters is the existence of a private sphere rather than what is inside. This also holds true for biometric privacy. Biometric privacy protection should focus on bodily and psychological integrity, preventing those technology conditions and operating practices that may lead to turn biometric recognition into a humiliating experience for the individual.

## KEYWORDS

data privacy, data protection, ethical issues in biometrics

## 1 | INTRODUCTION

Privacy protection is likely to be one of the main issues surrounding biometrics and its applications. A sharp debate has emerged [1] about whether biometric systems constitute a threat to privacy and if it is a demeaning technology. Discussion has chiefly focused on biometric data, considering data protection as the main safeguard of biometric privacy. Unfortunately, scholars have often taken it as granted that biometric data and privacy were almost the same, assuming that privacy is mainly about various degrees of anonymity and personal data ownership. In this paper, I will argue that privacy—at least as a personal experience—concerns the integrity of the borders of the private sphere rather than simply protecting private information itself. In other words, the psychological perception of privacy and its crucial relation with the development of personal identity depends primarily on the integrity of the boundaries between the person and the context in which he or she is immersed, regardless of the ability of the boundaries to contain and secure personal information [2].

The first two sections will be devoted to the rise of the information revolution and the notion of personal data. In the central part of the article, made up by five sections, I will examine the notion of privacy in its personal, biological, and psychological dimensions and the main threats to it. Finally, in the two final sections, I will discuss the main implications of the previous analysis on biometric privacy protection, and I will summarise my conclusions.

## 2 | EPOCHAL REVOLUTIONS AND THE RISE OF THE NOTION OF DATA

Human civilization has experienced three fundamental revolutions, which overturned the human fabric, and created a totally new world, encompassing epochal technological, economic, social and religious transformations. All these revolutions involved the transformation of a natural item into a new commodity. The appearance of a new commodity created in human societies a surplus of material wealth that contributed

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to originate new social relations and roles, ways of living, and worldviews.

The first revolution was the agricultural revolution during the Neolithic period, which started around 10.000 B.C., first in the Levant, then gradually spreading, across millennia, throughout the Mediterranean basin and to continental Europe. Scholars speak of “Agricultural Transition” to indicate the gradual shift from hunting and gathering to agriculture and farming. Hunter-gatherers were nomadic, they moved in small bands, provided with a very basic social organisation, chasing wild animals, and searching for edible plants and fruits. Agriculture and farming changed all that. Human groups gave birth to sedentary communities organised in small villages and towns and the population grew. Farming economy also meant the creation of food surpluses, which promoted the trade of food and food related products. The Agricultural Transition provided the material basis for creating new political structures, centralised administrations, social structures, economy systems, religious perspectives, and a new system for storing information based on writing [3]. Interestingly enough, the Agricultural Transition was likely to be also the time when identification systems first became necessary. Settlements imply travels to keep communities in contact with each other; travellers (e.g., traders, king's officials, soldiers, pilgrims, etc.) needed to recognise and be recognised abroad. One of the main drivers which made possible such a dramatic transformation was the creation of a new commodity, farming products [4]. To be sure, animals and plants were also valued in hunter-gatherer societies, but they were not marketable commodities owned by someone rather they were natural items that anyone could get hold of. By turning animals and plants into commodities, the Agricultural Transition created a large surplus of value that critically contributed to the Neolithic revolution.

The second revolution was the Industrial Revolution, which is normally believed to have taken place in Great Britain, continental Europe, and the United States between the mid-1700s and mid-1800s, but whose prodromes dated back to the 1600s, with dramatic changes in politics, science, economics, warfare, art, religion, and worldviews. In the second half of the 18th century, England controlled a vast colonial empire and was the richest country in the world, its population increased by 40% [5]. As a result, the need for food and clothing grew. In order to meet the demand, craftsmen increased production, using newly invented machinery. The application of technology to manufacturing soon extended to the iron and coal industries, and finally also to transportation, thanks to the invention of machines and locomotives, that produced mechanical energy through the use of steam. The cities populated; the countryside emptied. For the first time in human history, it was not agriculture that produced most of a country's wealth. Within a few decades, the English example was followed by other European countries, starting with France and Germany, and the United States [5]. The industrial revolution was driven by a combination of factors, yet the main driver was likely to be the rise of a new working system, the factory system [6]. The essence of the factory system relied on 1) systematic use of machines, 2) concentration of labour in a single place, the factory, and 3) the

division of labour into numerous simple repetitive, mechanical phases. The bosses that owned the capital needed to invest in machines and to pay the wages; the workers sold their time.<sup>1</sup> People had always been paid for their job, but they did not sell working hours as such, rather they were salaried for their skills, ability, vigour, etc. The idea that unskilled people could simply sell their time as commodity was completely extraneous to ancient civilisations [7]. The Industrial Revolution created a commodity that anyone had and could trade without needing any specific competence or knowledge. As with the Agricultural Revolution, the new commodity generated a cascade of consequences; almost every aspect of daily life was influenced in some way. Notably, the Industrial Revolution made to emerge also the need for more effective recognition schemes. “The first passports were issued in France by Luis XIV, and the first legislation in the West linking personal identities to birth registration was enacted during the French revolution (...) The new citizen who finally emerged from this process was an unmarked individual who was reliably distinguishable only through her name, nationality, place and date of birth. Religion, ethnicity, race, cast, social condition, etc, became (at least in principle) irrelevant in order to identify individuals, making all human beings equal before the state. In parallel, one of the main tasks (and sources of power) of modern states became to certificate (and guarantee) citizens' identities. This was realized by establishing, and ensuring continuity to, an “identity chain”, starting with civil birth registration and ending with death certificate” ([8], pp. 3–4).

We are now at the wake of the third epochal revolution, the Information Revolution [9]. It took millennia to realize the agricultural transition and centuries to complete the industrial revolution. The Information Revolution is instead progressing at the rate of decades. As the previous epochal transitions, the Information Revolution is also driven by the rise of a new commodity, say, information. Information has always existed and been traded; yet information could hardly be called a commodity. To be a real commodity, information needed to become easily measurable, storable, and interchangeable with other products. This became possible only in the second half of 1900s thanks to the increasing technological capacity for disassembling information into smaller, discrete, pieces, called “data”. Data is a Latin word, the plural of ‘datum’, “(thing) given,” past participle of dare “to give”. Data are “a fact given or granted”.<sup>2</sup> In principle, the term “data” can be used to refer to any piece of information, both qualitative and quantitative<sup>3</sup>; today it is used chiefly to mean quantitative, numerical

<sup>1</sup>“The clock, not the steam-engine, is the key-machine of the modern industrial age (...) The clock .. is a piece of power-machinery whose ‘product’ is seconds and minutes” wrote Lewis Mumford ([49], pp. 14–15).

<sup>2</sup>The first English use of the word “data” is from the 1640s, meaning “a fact given as the basis for calculation in mathematical problems.” From 1897 the term was used to mean “numerical facts”. Finally, in 1946 the word “data” was used to mean “transmissible and storable computer information” (Online Etymological Dictionary, 2021).

<sup>3</sup>Qualitative data are a representation of information in an analogous format; digital data are a representation of it into discrete elements. It is possible to number analogous information by arranging it along a numerical scale (e.g., mechanical clocks, mercury thermometers, etc.) and producing approximation measurements, yet only discrete information units can be truly numbered.

information. Numerical information is generated by slitting continuous variables into discrete elements and putting them in correspondence with a set of numbers, a process called “digitisation”.<sup>4</sup> Sensors are crucial elements in digitisation. A sensor is a mechanical device, module, machine which can be modified by an input signal, in a way which is proportional to the magnitude of the signal; this generates an electric output. Then through the simple repetitive measurement of the electric output at certain interval of time, the magnitude of the voltage is turned into a proportional number. Progresses in sensor technology (coupled with progresses in processing and storing data) dramatically increased our capacity to extract and manipulate quantitative information from continuous, qualitative variables. The ability of turning almost everything into measurable items, codifying them into digits, has been a key historical event, allowing information to be stored, sold, and marketed. The new ability of turning almost everything into measurable items marks the Information Revolution as commodification of plants and animals, and commodification of labour, marked the two previous revolutions.

### 3 | PERSONAL DATA PROTECTION

The concept of “data protection” emerges from the Information Revolution as a consequence of the new economic value of data. Data protection deals with normative issues related to the new commodity and refers to the regulation of a complex array of activities with the purpose of guaranteeing the free flow and trade of information. Conventional property rights are hardly applicable to digital information. Electronic information is disseminated, easily copied and duplicated; moreover, it is increasingly stored on electronic distributed systems. It is practically impossible knowing where information is stored, not even in which countries, under what jurisdictions, and who can actually access it [10]. This makes absolute data protection an illusory endeavour. What is feasible is control over collection and usage of data [11].

In such a context, the notion of personal data becomes paramount. Personal data are data extracted from persons and their private spheres. More precisely, personal data are any piece of information that can be used to identify a living person or to ascertain his physical presence somewhere and somewhen, like biometric data which is—so to speak—the paradigm of personal data. The idea of personal data represents a shift from personal knowledge understood as self-knowledge (attained by introspection) to personal knowledge understood as knowledge about the self (attained by technical instruments). Knowledge about oneself becomes detachable from the person. Personal features and qualities, once described only through narratives and images, can be now expressed in digits, and marketed. Personal data are considered sensitive—thus to be treated with extra security—when it allows to disclose details about racial or

ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, genetic make-up, a person's sex life or sexual orientation, biometrics [12].

### 4 | PRIVACY

“What is privacy? Etymologically the term derives from the Latin *privatus*, past participle of *privo*; “I deprive”, “I cut away”. Privacy thus refers to the state of being separated, secluded from others, in contrast to the state of being public or common. According to the Encyclopaedia of Privacy, it describes and demands “limits on the appropriation of others' peaceful seclusion, personal information, intimate choice, and identities” [13]. Scholars distinguish between physical (related to physical protection), psychological (related to personal autonomy), economic (related to property), informational (related to personal information), and decisional (related to decisional power) privacy. In fact, “privacy” means different things in different contexts. Although the term “privacy” cannot be found in all languages, the experience of privacy is a “cultural universal” [14], “an essential part of human flourishing and well-being”. The concept exhibits both broad and narrow meanings. In the former, privacy is a moral concept involving claims about the moral status of the individual self, its dignity, and relationships to others. This moral core is often taken to be the source of social values such as autonomy and integrity, which form a foundation for contemporary notions of human rights, citizenship and civic obligation (...). In the latter or narrow sense, privacy involves personal knowledge and the power to protect or control it. It concerns not only information about individuals but the right of individuals to determine how information about them is used.” ([15], p. 18–19).

In a broader sense, privacy “*guarantees psychological depth, providing individuals the space to separate from others; it establishes boundaries between the internal and external worlds, which are of paramount importance in order to fix identity. Some experiences are different when lived in a condition of seclusion. To preserve this difference among individuals who need to exist in organised groups, there is also a need to protect the existence of private realms (...)* Indeed the reaction against imposed nakedness in concentration camps and other physical degradations related to attempts to annihilate privacy is one root of the European self-understanding following World War II” ([15], p. 19). I will explore this argument and its genealogy more-in-depth in the next section.

In a narrower sense, privacy can be thought of as protection of information about oneself (understood as protection of personal data). A conception of privacy primarily based on the

<sup>4</sup>Digitization should not be confused with digitalization; digitization means analogue-to-digital conversion, digitalization instead concerns the process of substituting mechanical and human based processes with digital technology.

protection of personal data makes the concept of privacy more concrete. Today there are many technological, legal and operational reasons for often prioritising this approach: *“It is more specific, since it applies every time personal data are processed. The application of data protection rules does not require an answer to the question of a violation of privacy: data protection applies when the conditions stipulated by legislation are fulfilled. Furthermore, data protection rules are not prohibitive by default; they channel and control the way personal data are processed. Such data can only be legitimately processed provided some conditions pertaining to the transparency of the processing and the accountability of the data controller are met.”* [16]

## 5 | WHY IT IS USEFUL TO DISTINGUISH BETWEEN PRIVACY AS AN ETHICAL CONCEPT (BROAD SENSE) AND AS THE PROTECTION OF PERSONAL DATA (NARROW SENSE)

There is no doubt that the broad and narrow conceptions of privacy are closely intertwined, and I have just explained why, from a practical point of view, the narrow conception has some important advantages. However, the narrow conception is based on a form of reductionism that misses some crucial aspects of privacy. The idea of privacy in the broad sense concerns - as I have said - the integrity of the human person and his or her flourishing within the community. It is therefore a fundamentally qualitative concept that can only be measured in general terms of magnitude. Transgressions and offences against the broad concept of privacy are impossible to describe in quantitative and objectively circumscribable terms. How, for example, can one objectively assess the extent to which an individual's sense of personal intimacy is violated? Clearly, there are no objective parameters. Today we are used to considering knowledge that cannot be objectified as less reliable, but this is a prejudice and a form of cultural myopia. In fact, most of what is most important to human beings (from all forms of artistic expression to social, religious and emotional life) is not objectifiable. The transformation of qualitative information into quantitative information by means of datafication thus offers some undoubted practical advantages, but at the cost of a serious loss of meaning.

The confusion between privacy and personal data protection has contributed to generate a technical conception of privacy, framed in terms of risk management and technical ability to protect or to penetrate the (informational) private sphere. According to such a perspective, privacy is “the condition of not having undocumented personal information known or possessed by others” [17], as a consequence during the last few years most privacy issues have been turned into issues concerning various degrees of data anonymity and ownership. Also, the debate surrounding biometrics and privacy has been more and more framed in terms of personal data protection [18, 19]. To be sure, it is extremely important to protect biometrics data, because of many reasons, not the least their economic value. Yet even on the day we would be able to

secure full and total protection for biometric data (if ever), the issue of biometrics and privacy will continue to exist because it has its roots in the complex relationship between personal recognition and the private sphere [20].

The debate on the protection of biometric data is a vast and articulate one that has been at the forefront of the international arena in recent years, and this author has been one of its initiators [21]. It is precisely for this reason that I believe the time has come to look at the qualitative and less technical aspects of the concept of privacy. The need to keep these two aspects separate (always remembering that they are two sides of the same coin) is also indicated by the EU Charter of Fundamental Rights [22], where privacy and the protection of personal data are addressed in two different articles.

This is a necessity arising from two simultaneous needs: 1) the perception of new technologies and their acceptance depends crucially on their emotional intrusiveness and on how ‘respectful’ they are; technologies need to be kind and friendly; respecting privacy, understood in a broad sense, is a key factor in promoting a positive perception of biometrics; 2) personal data understood as quantitative elements contribute very little, if at all, to the construction of personal identities in their subjective dimension; in other words, the protection of personal data is not a critical factor for the harmonious psychological development of identity and privacy in individuals (the protection of quantitative personal data is fundamental from a legal and social point of view, but not from a psychological and human one).

In conclusion, this article is based on the idea that only through a serious consideration on the broader concept of privacy, alongside the narrow one based on data protection, will our society be able to effectively address the doubts that have been raised in recent years about the ethical issues related to biometrics.

In the next sections, I will substantiate my argument by exploring the personal (biological and psychological) origins of privacy and showing to what extent they are related to the idea of human dignity and to the experience of humiliation.

## 6 | BIOLOGICAL ROOTS OF PRIVACY

Philosophical, political, and social aspects of the relationship between privacy and biometrics are important issues, I have devoted many articles and books to them [1, 8, 21, 23, 24]. However, there is also personal dimension of biometric privacy. This perspective has been always little explored although it is highly relevant to individuals in real life [25].

The need for a private space, where others cannot penetrate, has roots that are older than historical human cultures, and it can be traced even in animals. Most animals tend to have outside boundaries of their movement during their everyday activities, these boundaries describe an area which is called by biologists a “home range” [26]. The notion of a home range is a complex one, because it involves both the idea that individuals need a certain degree of separateness from individuals of the same species, and the idea that they tend to delimit their own area of

activity and exploration. Moreover, some animals, called “territorial”, show a peculiar attitude to defend an area of territory around them, which is usually smaller than their home range. There are little doubts that among most mammalians, and notably amongst primates, the need to maintain a certain degree of independence is essential. “One basic finding of animal studies is that virtually all animals seek periods of individual seclusion of small-group intimacy” ([14], p. 16).

Also, human beings tend to segment the territory around them [27]. In the inner circle there is an area that is perceived to be private, which is commonly called “personal space.” Most people feel discomfort when their personal space is violated, and personal spaces can be trespassed only in particular circumstances and only by select others. This mechanism is rooted in neurophysiology, as it has been demonstrated by individuals who lack reactions to personal space violations and show lesions of a small cerebral region involved in emotional learning and memory modulation, the amygdale [28].

Animal studies also provide evidence that crowding may act as an intensifier of a stressful condition, and, under extreme conditions, can itself induce stress reactions or pathological behaviours; the most famous experiment was perhaps “Universe 25”, also known as the Mouse Utopia Experiment. In July 1968, John Calhoun, an American ethologist, decided to explore the concept of overpopulation [29]. Eight white rodents, the best specimens of the National Institute of Mental Health, were introduced into a square enclosure 2.7 m on each side, about half a metre high. They were guaranteed unlimited supplies of food and water, the temperature was a constant 20°, and there was no risk of outside predators. Their life in Universe 25 was just eating and reproducing. A true paradise for mice, which in fact led to the doubling of the population in a short time (the cage was able to ensure the survival of 3800 animals). After about a year and a half from the start of the experiment, the rodent community reached its maximum: 2200 individuals. From that moment on, a slow and puzzling degeneration began. Males began attacking females and pups, forcing them to isolate themselves in higher areas of the cage. The new-borns were left helpless because the mothers were busy defending their territory. There were also frequent episodes of cannibalism, even though food was always abundantly available. Younger mice “contested for roles in the filled social system. Males who failed, withdrew physically and psychologically”. Other mice became pansexual, attempting to have relations with any type of its similar, regardless of sex and age. Approximately 17 days after reaching the maximum peak of 2200 subjects, the growth of the mouse population came to a complete halt, the mice still able to reproduce had totally lost the social capacity to do so. Most females did not have a pregnancy (although biologically fertile). “Male counterparts to these non-reproducing females we soon dubbed the ‘beautiful ones’. They never engaged in sexual approaches towards females, and they never engaged in fighting, and so they had no wound or scar tissue. Thus, their pelage remained in excellent condition. Their behavioural repertoire became largely confined to eating, drinking, sleeping and grooming, none of which carried any social implications beyond that represented by contiguity of bodies.” Almost 4 years after the beginning of Universe 25, the

mouse community had technically died out. The outcome of Calhoun's publication shocked the entire scientific community, although some conclusions were partly contested by other scholars [30].

Also in human beings, studies [31] have indicated that crowding may have severe effects on individual performance, social behaviour, and health. Increasing the number of occupants of a given environment increases the number of potentially conflicting goals, until the moment when the individual may feel threatened or stressed.<sup>5</sup> Humans need the chance to retreat into secluded spaces every now and then, yet they are more adaptable than animals, and their feeling of being crowded does not just depend on objective factors, such as population density alone, but also by the subjective experience of crowding. The crowd can even become the way used by humans to defend themselves from the excessive proximity of their fellow man. In *Crowds and Power*, Elias Canetti notes, “There is nothing that man fears more than the touch of the unknown (...) All the distances which men create around themselves are dictated by this fear” yet, quite counterintuitively, “it is only in a crowd that man can become free of this fear of being touched. This is the only situation in which the fear changes into its opposite” ([32], p. 6).

## 6.1 | Nothing to hide

In a monograph that I published some years ago [33], I narrated Kristine's story. Kristine was a patient of mine, a young lady suffering from anorexia, “after some months of treatment, Kristine told me a bizarre story. She was around seven when she started having the odd impression that her parents were able to read her mind and to see her feelings. Such a conviction developed little by little. At the beginning, when she started to suspect that her parents could understand her thoughts, she experienced a very pleasant and relaxing state because she felt that her wants could be always anticipated and met, and she was freed forever from the need to ask. But as time went by, this experience became increasingly painful (...) Kristine therefore decided to ban any mental content when she was in the same room with her parents (...) With adolescence Kristine apparently recovered from her delusive belief and she felt free to think again, even in the face of her parents. But when she was around 20, her anorexia began”. When I asked why she was that disturbed by the idea that her parents knew her thoughts, she answered that there was no reason because she had nothing to hide.

As any typical psychoanalyst would have done, I assumed that her early thoughts were about sexual or aggressive contents. It was partly true, yet I was missing the point. It took a long time before I understood that Kristine was literally right, she had nothing to hide, not only in a more obvious Freudian sense (she had no penis to hide) but in a deeper sense. The

<sup>5</sup>Research of crowding [50] had focused mainly on residential settings (family dwelling, dormitories, and prisons), experimental laboratory settings, and public settings of metropolises [51].

original fusional experience with her parents, although initially pleasant, deprived her from the feeling of having a private mental life. Her early effort to create a condition of mental emptiness (which was then replicated by her anorexia) was paradoxically the last resort for her to invent a private identity, say, to exist as an individual. Kristina was hiding that she no longer had anything to hide.

As Kristine's case shows, the earliest forms of polarity between public and private can be probably traced to infancy. In early developmental stages infants hardly distinguish between themselves and the environment [2]. States of wholeness, timelessness and oneness alternate with states in which the awareness of space, time, and separateness, slowly emerge. Through mother's body, the infant starts exploring the world and perceiving a distinction between the inward and the outward. The inward is what is evident to the subject and can become evident to others only if it is communicated. To become an individual, the child must develop an "internal" space and create boundaries between inner and outer world. The basic experience which allows infants to realize that they are individuals is when they perceive that their thoughts and feelings are not immediately perceptible by adults [34]. This is an unpleasant experience because it originates from having their wants unmet, yet it also teaches infants something fundamental, that their fellows, even those who love them more, cannot read their thoughts, say, they have an identity distinct from anyone else identity. This is likely to be the earliest experience of what will become later the notion of privacy, which therefore implies that (1) some personal contents can be kept secluded (private) if one does not want to disclose them; and (2) the inner world may be bridged with the outer world through languages (both verbal and non-verbal). Inward and outward are in a mutual, ongoing, dynamic communication, and the main difference between private and public spheres does not dwell in any specific content but in the different rules that govern the two realms. Psychologically speaking, privacy is thus the process of negotiating boundaries between the inner part of the self and the external world [25]. This negotiation is influenced both by personal attitudes (subjectivity) and by social and cultural norms, that determine what, in each context and historical period, has to be protected as inherently personal, and what can be seen instead as a public matter.

The well-known argument "nothing to hide, nothing to fear" is not only legally and logically flawed [35] but it is also psychologically wrong. We do not need privacy to hide anything, rather we need to hide something (no matter what) to create our private sphere.

## 7 | PRIVACY, IDENTITY AND DIGNITY

There is an inextricable link between the notions of identity, recognition, privacy, and dignity. Understanding this interweaving is fundamental to understanding what is really at stake when it comes to biometric privacy protection.

I argued that human beings become individuals by developing a sense of personal identity which is strictly related to the

perception of having a private internal life. Privacy and identity are two sides of a same coin. Identity literally means sameness,  $A$  is identical to  $A$  ( $A = A$ ) if, and only if, there only a unique  $A$ , say, we counted twice ( $A$  and  $A$ ) what is actually one ( $A$ ). Personal identity means therefore that each person is unique. This feeling of uniqueness is what the experience of a private mental life generates throughout the normal development of a child.<sup>6</sup> Could someone know your personal identity? Rigorously speaking, he cannot. Personal identity is unknowable, because it is unique (to recognise means to know again, to identify someone or something from having encountered them before). In principle, only God can know your identity. What are we speaking about then when we speak of personal identification? We are speaking of recognising some property or quality of an individual which are not indicative of the absolute individuality or uniqueness of the individual in question. Physical attributes can be called "unique" only by approximation. There is no physical feature which is absolutely unique,<sup>7</sup> but all physical features can be recognized by analogy with similar physical features in other individuals. Once you have examined a fingerprint, you know what fingerprints are and you can recognise them when you see them for a second time. Something similar happens also with thoughts and emotions, you can recognise them only by analogy. At the end, we still perceive that something essential escapes us and that the deepest identity of the other person remains unknown to us. The distinction between identity and identification is, then, the distinction between who one fundamentally is, in a metaphysical sense, and how (or in virtue of what) in real life, one may be recognized and recognise. Human beings need both aspects. We exist as individuals because 1) we represent ourselves as unique autonomous subjects, capable of free decisions<sup>8</sup>; and 2) we are able to use recognized identities.

Both sides of the coin, being a unique autonomous person and using recognised identities, are essential components of the notion of dignity. Originally, dignity—which comes from the Latin *dignitatis*—indicated one's position in society, say, someone's social rank and value. With the Renaissance, dignity has been increasingly used to indicate the rank and value of humans in relation to other natural items. These rank and value were supposed to be the highest because—as it went the argument—human beings were the most marvellous piece of nature. Finally, from the eighteenth century on, human dignity means that every human being is unique, and thus priceless, and he participates in the dignity of the whole human species. Each human being must be respected because he or she is irreplaceable.<sup>9</sup> Dignity provides the actual

<sup>6</sup>I'm not arguing that each person is unique, which would be a pure metaphysical statement, rather I state that in standard conditions we perceive ourselves as unique, say, we perceive ourselves provided with a personal identity.

<sup>7</sup>This point is discussed in my paper "Identity, Identification, Recognition" in the present issue of *IET Biometrics*.

<sup>8</sup>Deciding does not imply acting; in fact, the impossibility of acting does not cancel individuality.

<sup>9</sup>This implies that human beings could be never treated as commodities because commodities are by definition fungible, thus replaceable.

foundation of the individual, understood as the holder of a unique personal identity.

The EU Charter of Fundamental Rights [22] has captured this idea quite well. Privacy is primarily addressed in Article seven yet from a careful reading, it emerges that the protection of privacy is discussed also in the first, most important, section devoted to Human Dignity. The Article three on the Right to the integrity of the person, reads: “1. Everyone has the right to respect for his or her physical and mental integrity 2. In the fields of medicine and biology, the following must be respected in particular: the free and informed consent of the person concerned, according to the procedures laid down by law [...]”. The context in which Article three is collocated points out that “the dignity principle should be regarded as a tool to identify the cases in which the body should be absolutely inviolable” and that consequently “the principle of inviolability of the body and physical and psychological integrity set out in Article three of the Charter of Fundamental Rights rules out any activity that may jeopardise integrity in whole or in part—even with the data subject’s consent” [36]. Personal integrity is violated any time that an undue and unsolicited intrusion “penetrates” the individual’s private sphere, independently from whether such an intrusion is tactile, visual, acoustic, psychological, etc. or whether it produces physical or mental injuries. It is the very intrusion in one’s privacy which offends human dignity.

In a broad sense, privacy thus relies on intimacy and respect. These two terms, intimacy and respect, allow us to approach the theme of dignity by grasping its two main facets. Intimacy speaks to us of something inviolable and inalienable, say, the ineffable dimension of personal identity as uniqueness. Respect tells us instead about the relationship of each one of us has with others, say, the process of mutual recognition. Privacy is infringed when intimacy and respect are offended, and individuals are undignified.

## 8 | RESPECT AND INTIMACY

Respect comes from the Latin *respēctu(m)*, a derivative of *respicere* meaning ‘to look back’, therefore ‘to consider, to have regard’. Respect means both the feeling of deference and esteem towards a person considered worthy, and the feeling that leads to recognise the rights, the role, the dignity, the decorum of people or things and refrain from offending them. Lack of respect is the denial of recognition in society. It thus implies some level of violated dignity.

Intimacy comes from the Latin *intimus* which means internal, secret. Intimacy is related to the human experience of disclosing one’s intimate core. Intimacy comes when we voluntarily disclose our private sphere, showing to someone else something that we feel deeply private. Intimacy is nurtured by the ability to make someone else to access—so to speak—our unique dimension, the ineffable part of what we are. However, unlike symbiosis, intimacy implies the maintenance of a sense of individuality. It is not fusion, instead it involves the ability to put oneself in the other’s skin without losing one’s own.

Intimacy requires discretion and respect, because “to be intimate with another” means “to rely on the hands of someone else”. The notion of intimacy also includes the feelings of modesty and shame [37]. Modesty and shame are universal, although deeply influenced by cultural contexts. In different epochs and in different cultures, they have concerned very different behaviours, body parts, and social situations, but in their elementary structure they have never changed [38].

Feelings of modesty concern the need to protect intimacy balancing the pleasure for exhibiting. Since we are hopelessly exposed to others and hopelessly objectified by the gaze of others, modesty is an attempt to maintain our subjectivity, so as to be “secretly” ourselves in the presence of others. Modesty is not a matter of clothes, petticoats, or intimate apparel, but a sort of vigilance about the degree of openness and closure towards the others. Modesty does not protect from nudity, both actual and symbolic, but from nakedness, from being stripped (or stripping oneself) of decency.<sup>10</sup> Modesty protects from the public exchange of personal intimate details, which is a peculiar feature of contemporary society [39]. To have nothing to hide, nothing to be ashamed of, and to be ready for revelations of intimacy, is perceived in our time as a way to express who you are. People are driven to share their psychological and physical intimacy; to expose their bodies as well as their feelings and emotions. They feel alienated and anonymous in the global crowd and imagine that by exposing themselves they can be more easily recognised. They think to nurture their identity, while instead they end up dissipating it. Once publicised, intimacy is dissolved and with it also our most intimate and unique traits. The last defence against the dissipation of intimacy is the feeling of shame. A lucid defence of the indispensability of shame was given by Carl Schneider, [40]. To Schneider shame is a fundamental emotion for protecting the person. We are—he argued—half-open beings, half public and half private. Shame helps to keep these two conditions in balance.

## 9 | HUMILIATION

Intrusions into an individual’s private sphere and intimacy, threaten simultaneously personal identity and dignity. We call “humiliation” such an experience of violated dignity, caused by an offence to bodily or psychological integrity. Humiliation and privacy infringement are two sides of the same coin [41].

The term “humiliation” comes from Latin *humilis* “lowly, humble,” literally “on the ground,” from *humus* “earth,” it is thus a word which refers to the experience of being knocked to the ground, of having one’s face crushed into dust. Humiliation is basically an experience of degradation. Degradation always implies a certain degree of self-degradation, as pointed out by Primo Levi [42]. Levi shows how physical and

<sup>10</sup>Nakedness is different from nudity. While nudity is the state of absence of clothing, nakedness is a mental state. Nakedness involves objectification, the process of symbolically turning a person into an object to be appraised. Nudity is an objective, empirical, condition; nakedness is a symbolic, culturally determined, experience.

psychological degradations always tend to produce the complicity of the victim; who is degraded often allows himself to be degraded; to survive (either in metaphorical or in real terms), he agrees to pay the price of degradation; he accepts—so to speak—to have his face crushed into dust provided he can spare his life. The main consequence of being humiliated is therefore an injury to self-respect, humiliation is “any sort of behaviour or condition that constitutes a sound reason for a person to consider his or her self-respect injured” ([43], p. 9). At the end, degradation destroys the sense of worth and self-esteem.

The feeling to have a recognised identity is the best shield against humiliation. Recognition is a vital necessity to preserve a sense of self and, ultimately, a sense of life. Describing life in the extermination camp of Auschwitz, Primo Levi writes “to live we need an identity, that is, a dignity... [in the camp] the two concepts coexist, whoever loses one also loses the other, he dies spiritually: without defences, he is therefore also exposed to physical death” ([42], p. 6). I argue that biometric privacy protection should be chiefly understood in terms of personal recognition, protection of physical and psychological integrity, and, finally, prevention of humiliating practices.

## 10 | BIOMETRIC PRIVACY PROTECTION

Scholars [44, 45], privacy advocates [46], national ethical committees [47], international organisations [48] have raised the question of whether biometrics are inherently demeaning, “*Do the various biometric data that we have just considered constitute authentic human identification? Or do they contribute on the contrary to instrumentalising the body and in a way dehumanising it by reducing a person to an assortment of biometric measurements?*” [47]. This question relies on three main arguments. The first is that biometrics digitise the human body, turning it into measurable quantities, and thus commodifies it. The commodification of the body, ultimately of the person, denies the main premise of the notion of personal dignity, namely the condition of being invaluable, priceless. The second argument is that biometrics threaten to bring down people to their digital identities, making them always visible and preventing any form of privacy and anonymity, “If the international system did embrace extensive use of biometrics or another globally unique identifier, the move could signal the effective end of anonymity. It would become feasible to compile a complete profile of a person's activities” [48]. The third argument concerns “the juridical-political status (it would be simpler, perhaps, to say bio-political) of citizens” ([44], p. 201). According to this argument, human beings have always been recognised through meaningful identifiers (e.g., bodily signs, memories, token, etc.) which told their history and stories. Such a dimension, full of human meanings, is nullified by biometrics, which are pure bodily signatures, mechanically extracted from our bodies by impersonal devices. Biometrics would not only depersonalise the subject, but they would even

dehumanise him. They would strip out any cultural dimension to human beings, turning them into almost branded beasts.

While suggestive, these three arguments present a fundamental flaw because they fail to understand what biometrics actually are.

Biometrics do not digitalise or informatise the human body, at least no more than digital cameras and most devices used in medical imaging. The shift from analogous to digital representations is full of meanings and consequences, yet it does not imply any transformation of the status of the human body. Personal data is not expression of the commodification of the body, rather it is a new commodity generated from already existing information about it. It is commodification of information about the person, it is not commodification of the person. To be sure, personal information turned into a commodity in shape of personal data needs special protection. Biometric data protection is an important issue, but it is—as I have previously illustrated—a legal and commercial matter rather than a privacy issue.

Biometrics are not unique identifiers and they do not capture any essence of an individual's identity. They do not tell who you are (only God could!), much more simply they are a tool to automate personal recognition, increasing its effectiveness (at least dealing with a large number of people). Personal identification is always recognition. Biometric devices and systems recognise by approximation what they have already met. Ultimately, they can only include an individual into smaller and smaller sets, with the objective, that can be reached only asymptotically, of capturing the ultimate set containing only one member, say, the person to be identified.<sup>11</sup> If anything, some reasons of concern are instead posed by wider biometric sets, like those generated using soft biometrics, because of their potentiality for sorting out people according to some shared attributes. Very rarely, dictatorships and totalitarian regimes have been interested in personal identification of large masses of people, rather they have always aimed to create categories of subjects which can be better controlled, stigmatised, discriminated against, even exterminated [23].

Eventually biometrics do not strip out biographical and cultural identities to humans, at least no more than paper IDs, passwords, and tokens. Names are symbols that remind that each one of us is the point of arrival of generations of human beings who lived, dreamt, loved, and suffered, before us. Agamben [44] would be correct in stating that biometric recognition strips out biographical and cultural identities to humans only if one supposes that biometrics may replace forever and entirely individuals' names. However, this holds true for any bureaucratic identifier, even the current name system is quite far from the cultural richness and wealth of biographical information provided by the middle age name system, which included baptised names, patronymics, family

<sup>11</sup>Multiple biometrics use a different strategy, instead of attempting of reducing set dimension, they generate various sets by using different biometric features, then they cross these sets. The person to be identified will be at the point of intersection among all these sets. Interestingly enough, this is probably how human mind works to recognise people and objects [52].



names, names related to a given community or a village or guild, nicknames generated by any physical feature or an episode in a person's life, and so on.

So, biometric privacy protection hardly concerns such epochal philosophical issues. In every-day life people are hardly concerned with the commodification of the body and similar matters, rather they may experience some very unpleasant situations when they are identified through biometrics. Biometrics can humiliate people. It may happen at least in two ways.

First, people can feel humiliated if they do not fit well with a given biometric system, for instance 'non-average' people (the 'outliers'). Moreover, some biometric systems may perform worse with people who possess (or don't possess) a certain feature or characteristic related to, for example, ethnicity, gender, occupation, age, and so. As a consequence, they may experience difficulties in enrolment or be erroneously rejected. Age, gender, ethnicity, physiognomy, look and appearance, behaviours, medical conditions, disabilities, and so may affect the effectiveness of biometric systems, notably in large scale applications. Usually, systems are designed to offer fallback alternatives, but these are often time-consuming to pursue and can create some perception of stigma at "failing" the system. For instance, think of a queue in an airport and a senior person who fails, in the presence of people waiting their turn in the line, to be enrolled or is rejected by the biometric system. It is not his fault, he could have just a slight deterioration of his fingerprints due to his age, yet it would be difficult for him to completely avoid the humiliating experience of perceiving himself as "that stupid old man who is not at ease with modern technology". Failures in enrolment can also expose medical conditions or disabilities or just peculiar physical traits that the individual would prefer to keep private; this humiliating experience can arrive in a public setting or when you are with someone you wish to ignore that detail (e.g., your partner, your boss, a colleague of you, a friend). All these examples show how privacy can be easily violated and dignity offended in a quite banal way, which does not imply any major issue among those usually discussed by privacy advocates.

The second way in which biometric systems may threaten an individual's private sphere is by being physically or psychologically intrusive. For instance, they could force the subject to stay too close to the operator, or they could force him to take uncomfortable, or ridiculous, or degrading, physical positions. This may depend on various conditions, notably with 'non-average' people, like those who are "too tall" or "too short", "too thin" or "too fat". In all cases, the result is to violate people's feelings of intimacy and modesty, to jeopardise their integrity, to humiliate them. However, only rarely do these examples of biometric malpractice depend on technology design, although it cannot be always excluded. More often they are due to the standard operational procedures, which are designed to optimise system performance and effectiveness paying very little attention to courtesy and politeness. Unfortunately, privacy impact assessments usually fail to analyse

standard operational procedures, only focusing on technology. This is a very short-sighted approach to real life biometrics, because in everyday life "polite biometrics" would be paramount to improve people experience with biometric recognition and technology acceptance.

## 11 | CONCLUSIONS

Information Revolution is changing human life, the methods for human recognition included. The main event, from which all others are originating, is the increasing technological capacity of converting analogous into digital variables which has generated a new commodity, data. Biometric data are an instance of personal data, say, data extracted from the private sphere of an individual. This has led privacy students to suppose that biometric privacy protection would coincide with biometric data protection. At least from an individual perspective, this assumption is wrong. The notion of privacy, understood as a personal intimate sphere, is hardly related to what is contained in the private realm (data or whatever else), rather it is related to the very existence of a private sphere. Privacy relies on having the possibility to hide rather than on actually hiding and on what is hidden. Consequently, privacy breaches have more to do with bodily and psychological integrity than with data protection, which is basically a legal and commercial issue. This holds true also for biometric data.

Biometric privacy protection chiefly concerns the strict relationship between personal identity and dignity, these two concepts almost being two sides of the same coin. Privacy depends on intimacy and respect. Humiliation and degradation are the most frequent expressions of privacy breaches in everyday life. Biometric privacy protection should focus on preventing technology conditions and operating practices that may lead to turn biometric recognition into a humiliating experience for the individual.

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None.

## DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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