The Ethical Dimension of Artificial Intelligence Biometric Identity and Human Behaviour

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ABSTRACT

The debate over the ethical repercussions of Artificial Intelligence (AI) cannot disregard the "sum total of ideas that bring into evidence a system of ethical reference that justifies that profound dimension of technology as a central element in the attainment of a 'finalized' perfection of man"(Galvan 2001). This implies an analysis of the ancient processes that might help to understand the complexities of contemporary society and the new challenges posed to human development. Being at the core of the dichotomy between the human and the machine, biometrics will be central to the analysis carried out in this paper. Its measurement of physiological characteristics and behavioural patterns has politico-philosophical and legal consequences in terms of recognition and personal identity, as the use of artificial intelligence has shown. In information society, customs and traditions, cultural and communication processes, language and the self-determination of the individual have gradually acquired a stretched dimension that has led to a re-definition of the social structures within which the exchange of knowledge and data takes place, with AI-based technological devices playing a key role in such a scenario. The issue of biometric identity becomes highly complex when combined with the potential of digital services, as it is at this level that it shows the large number of interconnections deriving from social and political choices. The benefits of increased interconnection are limited by the risk of intrusion into the (social, personal or private) human sphere, which might pose a threat to both the physical, biological body, with its related freedoms (habeas corpus), and the digital body, in its multiple forms and media representations (habeas data).

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1. The Relationship between the Human and the Machine: Introductory Remarks

Progress has always been interconnected with science and technology, a relationship that has contributed to shaping production, consumption, customs and traditions. Within this context, information technology can be regarded as the autonomous discipline that has led to the development of data processing methods, information and communications technologies, social media, automatic identification and data capture, cyberspace, and Artificial Intelligence (AI). This scientific and technological revolution has impacted communication, management strategies, relationships, collective intelligence,[1] the dimension of identity and the self-determination processes involving the dichotomy between the human and the machine.

In the first decade of the 20th century, the European cultural crisis triggered a debate about the ethical implications of the relationship between science and technology, which may be traced back to two different semantic traditions. The first of such traditions dates back to the philosophical and political thought of classical antiquity, whereas the second is connected with the change in paradigm brought about by the scientific revolution of the 17th century, which resulted in a fusion of theory and practice, science and technology. However, scientific knowledge was still far from a systematic practical application.[2]

Throughout the 16th century, a naturalistic concept of science prevailed, with its qualitative interpretation of the world. It was only in the 17th century that a new idea of science developed in England and France before spreading to the rest of Europe. Seen as being based on objective evidence, science started to focus on the analysis of the causes of phenomena, thus rejecting any metaphysical reflection and implication. Such a new perspective led to the development of mechanical philosophy.[3]

A further advance was made between the late 18th and the early 19th centuries, when a new mathematical approach was adopted following the devel-

[1] Cf. P. Levy, *L'intelligenza collettiva: per un'antropologia del cyberspazio* (D. Feroldi, M. Colò, Trans.), Feltrinelli, 2002, p. 86.
[2] Cf. D. Lecourt (eds.), *Dictionnaire d'Histoire et Philosophie des Sciences*, Paris, Presses Universitaires de France, 1999.
[3] G. Preite, *Politica e biometria. Nuove prospettive filosofiche delle scienze sociali*, Trento, Tangram Edizioni Scientifiche 2016, p. 101.

opment of probability theory and based on the contribution to deterministic theory made by French scholars such as Laplace and Quételet. By combining a theoretical approach with the practical observation of biological and natural phenomena, Quételet analysed social phenomena in terms of "moral statistics", identifying patterns that could be expressed by mathematical formulas.[4] Such a perspective seems to be particularly interesting when considering the application of ethics to the field of science and new technologies.

The mathematical approach to socio-political issues and the quantitative analysis of natural phenomena allowed this new system to develop in various fields of knowledge, paving the way to a new era in the dichotomy between the human and the machine. Unsurprisingly, this carried further ethical implications, made even more significant by the development of biometrics as a science in the early 1900s.

Being at the core of the dichotomy between the human and the machine, biometrics will be central to the analysis carried out in this paper. Its measurement of physiological characteristics and behavioural patterns has politico-philosophical and legal consequences in terms of recognition and personal identity, as the use of artificial intelligence has shown.

The most significant studies in the biometric field have been carried out by Galton.[5] In the early 1900s, he conducted a quantitative analysis of physical (biometric) and psychological (psychometric) characteristics, exploring the application of statistical methods to the identification of unambiguous (human) traits.

In the 1930s, biometrics developed even further, thanks to Fisher's theory of experimental design and statistical estimation,[6] and his tests demonstrating the importance of random sampling,[7] detailed in *The Design of Experiments* (1935).

[4] ibid., p. 42.

[5] J. Jassò, E. Lombardo, M.A. Pannone, *La macchina di Galton: un ipertesto per lo studio della curva normale*, CIRDIS, Perugia, 2004, p. 7.

[6] E. Piazza, *Probabilità e Statistica*, Bologna, Società Editrice Esculapio, 2014, p. 299.

[7] R. A. Fisher (1890-1962). Fisher's theory of experimental design and analysis of variance were unprecedented as practical methods of using experimental data.

In the 1960s, Benzécri[8] developed multivariate data analysis, which is still advantageously adopted[9] in different fields. The benefits of such an approach are also linked to the advances made in AI, which have contributed to faster data processing and to the analysis of large sets of qualitative and quantitative data relating to various statistical units.

The end of the 20th century represented a turning point in social and applied sciences, in terms of theories, paradigms and analysis methods. The revolution brought about by the development of information technologies was even more impactful than the industrial one, as it was characterised by a potential spread of information and data that could go beyond both temporal and spatial boundaries.

In information society, customs and traditions, cultural and communication processes, language and the self-determination of the individual have gradually acquired a stretched dimension that has led to a re-definition of the social structures within which the exchange of knowledge and data takes place, with AI-based technological devices playing a key role in such a scenario.

The issue of biometric identity becomes highly complex when combined with the potential of digital services, as it is at this level that it shows the large number of interconnections deriving from social and political choices.[10] The benefits of increased interconnection are limited by the risk of intrusion into the (social, personal or private) human sphere, which might pose a threat to both the physical, biological body, with its related freedoms (*habeas corpus*), and the digital body, in its multiple forms and media representations (*habeas data*).

Despite providing clear benefits, the Internet of Things (IoT) might result in a violation of rights and freedoms, thus giving rise to discrimination and bullying. Within the context of the IoT, everything is transformed into data, including human beings, even when they are physically present. This is made possible by digital "sentries" (such as cameras, microphones, smart home devices, medical devices, biotechnologies, and even appliances and nano-components of commonly used devices), which capture large and complex data sets (referred to as big data) that are later processed to provide information. This system makes

[8] Benzécri's approach to data analysis has been considered revolutionary in terms of the interpretation of results.

[9] Cf. J.P. Benzécri, L'analyse des données. Tome I: La taxonomie; Tome II: L'analyse des correspondances, Dunod, Paris.

[10] Cf. J. Van Dijk, *Sociologia dei nuovi media*, trad. it., Bologna, Il Mulino, 2002.

machines increasingly more "intelligent".[11] Non-human algorithms transform data into information to be turned into details about an individual's life, thus bringing a constructed, invented reality, as Watzlawick[12] would call it, into the physical world. Having no longer just a passive "sensing" function, these "sentries" – the intelligent machines – are becoming agents. They can learn from human behaviour, make decisions, and act based on digital ideas, which might lead to a dehumanisation of power at all levels. Such a process certainly has a new, significant ethical impact, besides affecting legal, political and social contexts.

2. A Historical-Philosophical Analysis of the Relationship between Nature, Science and Technology

The debate over the ethical repercussions of AI cannot disregard the "sum total of ideas that bring into evidence a system of ethical reference that justifies that profound dimension of technology as a central element in the attainment of a 'finalized' perfection of man."[13] This implies an analysis of the ancient processes that might help to understand the complexities of contemporary society and the new challenges posed to human development.

The origins of such processes can be traced back to classical antiquity and the reflection on the relationship between *techne*, nature (*physis)* and science (*episteme)*. Due to their being part of nature, human beings play a key role in such a reflection, with *techne* helping them to overcome barriers and compensate for their biological and physiological limitations.

In ancient Greece, technology was considered to be a divine prerogative. Aeschylus' *Prometheus Bound* is one of the myths that best show both the human nature of technology and its being a gift from the gods. Although Prometheus gives technology to humankind to ensure the survival of human beings, he does so against Zeus' will, as the king of the gods fears that humankind might become too powerful once learned how to use it. Technical knowledge symbolised by fire has such an impact on human beings that "[t]hey were like children

[11] L. Bolognini, *Per uno stato di diritto nell'era dell'Intelligenza Artificiale*, TEDxUdine, at https://www.youtube.com/watch?v=TwuB20pCbCg&t=906s, accessed 28/09/2022.
[12] Cf. P. Watzlawick (ed.), *Die erfundene wirklichkeit*, München, R. Piper & Co. Verlag, 1981.
[13] Cf. J.M. Galvan, *Humanoids. A Techno Ontological Approach*, Lecture, Tokyo, 2001.

in their wits before, until I taught them how to use their minds."[14] Once a gift from the gods, technology soon became a prerogative of humankind, enabling human beings to be increasingly more independent from the mythical-religious context they lived in. However, the natural world still regulated life and human interaction, being the reference point for the development of human laws and moral principles.

Aristotle focused on the relationship between *physis* and *techne*, in which nature might be seen as "the primary underlying matter of things which have in themselves a principle of motion or change."[15] On the other hand, *techne* describes an art, an ability to create artificial products, which generally corresponds to a practical skill, the poietic dimension, i.e. the ability to produce by imitating nature.[16] According to Aristotle, *episteme* is based on theoretical speculation about the nature of the world, as it is not a productive science nor is it aimed at transforming the physical world.[17]

An innovative concept of science as *episteme* developed only in the early modern period, between the publication of Copernicus' *De Revolutionibus Orbium Coelestium* in the 1550s and Newton's *Philosophiae Naturalis Principia Mathematica* in the late 1600s. The change in paradigm brought about by the scientific revolution led to the relationship between pure and applied knowledge being reconsidered. As a result, a new concept of science developed. Being now seen as based on objective evidence, science started to focus on the analysis of the causes of phenomena and on the development of laws centred on hypotheses, verified by experiments and expressed in mathematical terms.[18] By rejecting any metaphysical reflection and implication, such an approach led to the development of mechanical philosophy, whose principles prevailed until late modernity.

In the early 1900s, technology became a subject of intense philosophical debate, with a number of thinkers reflecting on the matter. Heidegger was

[14] Aeschylus, *Prometheus Bound*, in M. Lefkowitz, J. Romm (eds.), *The Greek Plays: Sixteen Plays by Aeschylus, Sophocles, and Euripides*, Modern Library, New York, 2016, p. 198.
[15] Aristotle, *Physics*, book 2, 1, 193a, 28-29, in Barnes J. (ed.), *The Complete Works of Aristotle. The Revised Oxford Translation*, Vol. 1, 1991, p. 20.
[16] ibid., 192b, 28-30.
[17] Aristotle, *Metaphysics*, book 1, 982b, 10-30, in *Aristotle in 23 Volumes,* Vols.17, 18 (H. Tredennick, Trans.), Cambridge, MA, Harvard University Press; London, William Heinemann Ltd. 1933, 1989.
[18] P. Rossi (ed.), *La rivoluzione scientifica da Copernico a Newton*, ETS, Pisa, 2020.

one of the first to analyse the concept by adopting a non-dualistic approach. Rather than either condemn or enthusiastically embrace it, he saw technology as a mode of knowledge. Heidegger considered *techne* to be *poiesis*, as it does not make reference to material technological development, but to "unconcealedness". As he pointed out,

> Technology is not equivalent to the essence of technology. [...] Likewise, the essence of technology is by no means anything technological. Thus we shall never experience our relationship to the essence of technology so long as we merely conceive and push forward the technological, put up with it, or evade it. Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. But we are delivered over to it in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us utterly blind to the essence of technology.[19]

However, Heidegger clarified that "[w]hat is dangerous is not technology. There is no demonry of technology, but rather there is the mystery of its essence. The essence of technology, as a destining of revealing, is the danger."[20] Therefore, the reflection on technology becomes crucial, as it introduces a reflection on *the agent*, the subject, which results in technology being no neutral application of tools, but rather paving the way to the reason of truth that causes the abandonment of being.

In the 1930s, Ortega y Gasset embraced Heidegger's concept of *Being-in-the-world* (*in-der-Welt-sein*). From this perspective, the meaning of life is projection that develops over time, with the being participating in the mutual relationship between the self and the world, rather than being part of an atemporal moment.

However, far from being static and well-defined, the external world is characterised by dynamism: it is the *horizon* of circumstance. Such a horizon makes it easy to understand why animals, which have their own place in nature, differ from human beings. The only living beings that can never adapt to the world around them, human beings *create* a new kind of nature by making use of a specific tool: technology. Human beings make a great effort to survive, to *be* in the world. Even when nature does not provide them with the tools to satisfy

[19] M. Heidegger, *The Question Concerning Technology and Other Essays* (W. Lovitt, Trans.), Harper & Row, Publishers, Inc., 1977, p. 4.
[20] ibid., p. 28.

their necessities, they commit to change nature rather than resign themselves to a lack of resources. Such actions represent technology, which is indissolubly linked to human existence. It is a reaction upon nature or circumstances that leads to the construction of a new nature, a supernature interposed between the human being and original nature.[21]

Technology is interconnected with a concept of *human necessity* that includes both what is objectively necessary and what is superfluous. Consequently, from the point of view of bare living, animals need no technology, whereas human beings cannot do without it. Conceiving of life as *well-being*, rather than mere *being*, the human being is a technician by nature, the creator of superfluities. The human being, "[...] technology, well-being are, in the last instance, synonymous."[22]

Such reflection does not seem to warn against technology per se, but rather against the use that human beings might make of it. Heidegger emphasised a non-neutral use of technological tools. Furthermore, Ortega y Gasset pointed out that, although every aspect of the presence of technology has been thoroughly analysed, only one remark may be plausible: technology progresses. Such a generalisation may be opposed by another plausible one: technology does not always move towards the sky, as it sometimes reaches the abyss, the source of darkness. As a result, reflection should be aimed at understanding destiny, the direction that has been taken.[23] Therefore, Ortega y Gasset was ahead of his time when he stated that "[a] subject to be ardently discussed in the coming years is that of the advantages, the threat, and the limitations of technology."[24] Unlike Heidegger's, Ortega y Gasset's reflection paved the way for something that became crucial in the 1950s, i.e. the need to strike a balance between the benefits of technology and the risks associated with its inappropriate use.

Having been combined with science, technology has started to be characterised by *reproducibility*, which is increasingly leading to a careful evaluation of its potential uses.

[21] J. Ortega y Gasset, J. W. Miller, *History as a System and Other Essays Toward a Philosophy of History* (H. Weyl, Trans.), new edition, New York: W. W. Norton & Company, 1962, p. 95.
[22] ibid., p. 100.
[23] ibid., p. 142.
[24] ibid., p. 87.

In the 1950s, technology was applied to a new field of (technical and scientific) knowledge: Artificial Intelligence. In 1956, at a conference at Dartmouth College, New Hampshire, AI was described as a series of technologies that could be applied, with specific methods, to machines capable of processing large data sets, working in an "intelligent" way to achieve the most diverse objectives. In other words, the expression "artificial intelligence" refers to different branches of knowledge, services, and technoscientific products that share the definition developed by McCarthy, Minsky, Rochester, and Shannon, following which "the artificial intelligence problem is taken to be that of making a machine behave in ways that would be called intelligent if a human were so behaving."[25]

Such a statement seems to be counterfactual, being focused on behaviour rather than thought. If a human being so behaved, such behaviour would be called intelligent, although this does not mean that a machine is intelligent or that it can think.[26]

In the 1970s, progress and the improvement of living conditions paved the way to the concept of Bios, which resulted in the development of two different perspectives, bioethics and biopolitics. Focusing on the relationship between science, technology and ethics, bioethics aims at setting a limit on the use of technological innovations based on scientific knowledge, in order to protect living beings, and especially vulnerable subjects, from the threat posed by progress, something that has become particularly necessary since the post-World War II era.[27] On the other hand, biopolitics, which progressed mainly thanks to Foucault's contribution, is a philosophical reflection on a series of socio-political phenomena characterised by issues concerning life and its regulation in contexts that might either threaten or foster it.[28]

[25] J. McCarthy, M.L. Minsky, N. Rochester, C.E. Shannon, *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence*, 31 August 1955.

[26] L. Floridi, *Digital's Cleaving Power and Its Consequences*, in "Philosophy and Technology", 2017: 30(2), pp. 123-129.

[27] V.R. Potter, *Bioethics. The Science of Survival*, in "Perspectives in Biology and Medicine", 1970, 14 (1), pp. 127-153.

[28] The reflection on life and the power that might be exerted over it started to develop in the 1800s, when positivist Auguste Comte introduced the concept of biocracy. However, it was only in the 1970s, following Foucault's reflection on power and social control, that the issue of biopolitics was highlighted. Foucault explored the various ways in which power is exercised, impacting both individual and collective life.

3. Ethical Implications: Human Progress and Artificial Intelligence

While in Heidegger's reflection technology is a metaphysical problem, with the development of bioethics the issue starts to revolve around ethics, becoming a matter of human practice.

Hottois and Jonas have pointed out how the ethical issue is connected with the dimension of the future and technoscience. Hottois has wondered what is going to happen to the human being and, worried about the future of humankind, has tried to emphasise the need for collective responsibility towards new generations.[29] Similarly, Jonas has highlighted how the ambivalence that is intrinsic to modern technology makes it dangerous, even when it is used to pursue legitimate aims. In order to prevent the risks it might pose, some ethical constraints should be imposed on technology, as its cumulative effects might impact multiple future generations. "The point here is that the intrusion of distant future and global scales into our everyday, mundane decisions is an ethical novum which technology has thrust on us; and the ethical category pre-eminently summoned by this novel fact is: *responsibility*."[30]

In the years that followed the development of bioethics, scholars focused on identifying universally acceptable principles that might guide human action, regardless of specific ethical systems. The principle of responsibility can be considered one of such principles, since bioethics itself might be said to be a "bridge to the future", as Potter has pointed out to emphasise the task it has to accomplish: orienting human action to ensure the survival of humankind.[31]

In particular, the progress made in the medical and biotechnological fields has encouraged (North-American) scholars to identify some ethical principles that might guide doctors and scientists. In *Principles of Biomedical Ethics*, published in 1979, Beauchamp and Childress fostered a new ethical paradigm capable of orienting the action and decisions of those working in the healthcare sector.[32] In the same year, such principles were also included in *The Belmont Report*, written by the National Commission for the protection of human subjects of biomedical and behavioural research. The principles were

[29] G. Hottois, *Le paradigme Bioéthique. Une éthique pour la technoscience*, Bruxelles, 1990, p. 119 ff.

[30] H. Jonas, *Technology as a Subject for Ethics* in "Social Research", 49(4), 1892, pp. 891-898, p. 892.

[31] V.R. Potter, *Bioethics. Bridge to the Future*, Englewood Cliffs, N. J. Prentice-Hall, 1971.

[32] T.L. Beauchamp, J.F. Childress, *Principles of Biomedical Ethics*, Oxford University Press, New York, 1994.

adopted in order to solve the ethical conflict arising from the particular norms that experimenters need to conform to when carrying out tests. Four core principles were identified: the principle of beneficence, following which risks should be minimised and benefits maximised; the principle of non-maleficence, which holds that no harm should be inflicted to others; the principle of autonomy, which establishes that the individuals participating in any study should be considered autonomous agents, capable of deliberation and acting under no coercion, which results in informed consent; and the principle of justice, which deals with a fair distribution of benefits and burdens of research.

Reflecting on the future of bioethics, Jonas has highlighted the need to overcome the current anthropocentric approach, since the entire biosphere of the planet, rich in species and vulnerable to human action, deserves to be protected.[33] The imperative of handing down an untarnished legacy to future generations should also imply obligations towards nature, whose depletion unavoidably affects human life.

Such a concept should be extended to include AI and the infosphere, the space where current information societies develop. No longer characterised by being either online or offline, current information societies are *onlife*, being continuously both analogue and digital.[34]

The past few years have been marked by new behavioural patterns linked to AI. Despite not being intelligent per se[35], AI entails an increasing ability to *envelop*, and hence reshape, the environments in which it works, adapting them to its needs. The disjunction between intelligent behaviour and envelopment of the world poses a series of ethical challenges, in terms of autonomy, bias, explicability, justice, privacy, responsibility, transparency, and trust.[36]

AI has been the subject of varying opinions resulting from the heterogenous perspectives provided by two main contemporary movements – Transhumanism and Posthumanism. Such movements have amplified its impact in

[33] H. Jonas, *Technology as a Subject for Ethics*, *op.cit.*

[34] L. Floridi, *The Ethics of Information*, Oxford University Press, New York, 2013.

[35] We agree with Floridi (*Etica dell'intelligenza artificiale. Sviluppi, opportunità, sfide*, Raffaello Cortina Editore, Milano, 2022, p. 32) when he says that the definition of AI as a synthesis of artificial action and intelligent behaviour may lead to a misunderstanding. Conversely, AI may be successful when the ability to complete a task is decoupled from any need to be intelligent. In other words, the intelligence a human being may need when dealing with a specific situation does not correspond to the ability of a machine in the same situation: what AI can do may be decoupled from human intelligence.

[36] L. Floridi, *Etica dell'intelligenza artificiale. Sviluppi, opportunità, sfide*, *op. cit.*, p. 79.

terms of both hope and fear of being superseded, with all the advantages and risks connected with that.[37]

Therefore, the analysis of ethical issues has been broadened to include AI, with scholars trying to identify some guiding principles also in this field. Since 2017, following the Asilomar AI Principles and the Montréal Declaration for responsible AI development, many organisations have been working on establishing ethical principles for the adoption of socially beneficial AI. However, a sheer number of sets of principles has been proposed, some of them being either unnecessarily redundant or significantly different, thus giving rise to confusion and ambiguity.

In order to solve the problem of principle proliferation, only the sets of principles that meet four basic criteria should be taken into account. They should be *recent*, that is published after 2017; directly *relevant* to AI and its impact on society as a whole; highly *reputable*, that is published by authoritative, multi-stakeholder organisations with at least national scope; and *influential*, being both recent and reputable.[38]

[37] Cf. B. Henry, Review of F. Ferrando, *Il Postumanesimo filosofico e le sue alterità* (ETS 2016), in "Lo Sguardo – rivista di filosofia" N. 24, 2017 (II) – "Limiti e confini del postumano", pp. 291-296; F. Ferrando, *Postumanesimo, transumanesimo, antiumanesimo, metaumanesimo e nuovo materialismo*, in "Lo Sguardo – rivista di filosofia" N. 24, 2017 (II) – "Limiti e confini del postumano", pp. 51-61. In this perspective, the philosophical trends associated with Transhumanism and Posthumanism suggest different points of view. In order to identify the main aspects characterising such reflections, it should be pointed out that Transhumanism focuses on the enhancement of the human condition through research and development in biotechnology and the digital sector. Therefore, emphasis is placed on concepts such as rationality, progress, and optimism, which shows how Transhumanism has its philosophical roots in the Enlightenment. On the other hand, Posthumanism does not consider technology its main objective, it does not see it as something to fight against or be scared of, but it rather views it as a trait of the human outfit. Posthumanism aims at dismantling the dominance of the human being that has led to the current anthropocentric approach, characterised by gender inequalities, racist attitudes, class discrimination, homophobic behaviour, and ethnocentrism. Far from being considered a means to obtain something – energy, more sophisticated technology or immortality – technology enters the posthumanist debate through the mediation of Feminism, and especially through Donna Haraway's cyborg and its dismantling of dualisms and boundaries, such as the boundary between machine and organism, the boundary between the physical and the nonphysical, and ultimately the boundary between technology and the self. The non-separateness between the human and technological realms should be analysed not only from an anthropological and paleontological perspective, but also from an ontological one. Within the posthumanist framework, technology may be interpreted in light of Martin Heidegger's theories in *The Question Concerning Technology*, where he described it as a way of revealing.

[38] L. Floridi, *Etica dell'intelligenza artificiale. Sviluppi, opportunità, sfide*, *op. cit.*, pp. 80-82.

Such an approach has resulted in the identification of 47 principles that are characterised by a large degree of coherence and overlap. This convergence can most clearly be shown by comparing the sets of principles with the four core principles commonly used in bioethics: *beneficence*, *non-maleficence*, *autonomy*, and *justice*. Based on the idea that AI is not a new form of intelligence, but rather an unprecedented way of acting, bioethics is the area of applied ethics that seems to be more similar to digital ethics in adopting an ecological approach to new kinds of agents, patients, and environments.[39]

However, although the four bioethical principles are in line with the new ethical challenges AI poses, they cannot be seen as exhaustive.

A comparative analysis emphasises the need for an additional principle: the principle of *explicability*, "understood as incorporating both the *epistemological* sense of *intelligibility* (as an answer to the question 'how does it work?') and in the *ethical* sense of *accountability* (as an answer to the question: 'who is responsible for the way it works?')."[40] This should apply to both experts, such as product designers or engineers, and non-experts, such as patients or business customers.

When applying the principles of bioethics to AI, the prominence of beneficence underlines the central importance of promoting the well-being of people and the planet with AI. The concept of non-maleficence is often combined with the idea of beneficence and associated with the various negative consequences of overusing or misusing AI technologies, including the infringement of personal privacy. However, it is not clear whether it is the people developing AI, or the technology itself, which should do no harm. Such a dilemma is linked to the issue of autonomy. The principle of autonomy in the context of AI highlights the need to strike a balance between the decision-making power that individuals retain for themselves and that which they delegate to artificial agents. The risk is that the growth in artificial autonomy may undermine human autonomy. For this reason, human autonomy should be fostered, whereas the autonomy of machines should be restricted and made intrinsically reversible, allowing

[39] Cf. L. Floridi, *The Ethics of Information*, *op. cit.*

[40] L. Floridi, J. Cowls, *A Unified Framework of Five Principles for AI in Society*, 2019, at https://hdsr.mitpress.mit.edu/pub/l0jsh9d1/release/8, accessed 14/11/2022.

for the reestablishment of human autonomy when necessary.[41] Finally, the principle of justice emphasises the crucial need to "contribute to global justice and equal access to the benefits" [42] of AI technologies.

The addition of the principle of "explicability", which includes both the epistemological sense of "intelligibility" and the ethical sense of "accountability", makes the ethical reflection on AI more exhaustive. Such a principle complements the other four: "for AI to be beneficent and non-maleficent, we must be able to understand the good or harm it is actually doing to society, and in which ways; for AI to promote and not constrain human autonomy, our 'decision about who should decide' must be informed by knowledge of how AI would act instead of us; and for AI to be just, we must know whom to hold accountable in the event of a serious, negative outcome, which would require in turn adequate understanding of why this outcome arose."[43]

In the digital reality, which is parallel to the natural one, the governance of digital technologies seems to matter more than digital innovation. This is due to the fact that the digital revolution is changing the individual's values and priorities, impacting their behaviour and influencing their ideas about sustainable and socially beneficial innovation. The infosphere poses a series of crucial sociopolitical dilemmas about the development of information societies and the human project for the digital era. Consequently, the governance of digital technologies should interact with both digital ethics and digital regulation, two different but complementary approaches.

Digital governance is the process of establishing and implementing policies, procedures, and standards to properly develop, use, and manage the infosphere. To this end, digital governance might include guidelines and recommendations that may overlap with digital regulation, despite not being identical to that. Digital regulation refers to a set of laws adopted and enforced through social and governmental institutions to regulate the behaviour of significant agents in the infosphere. Although governance and regulation are interconnected, not all the aspects of digital regulation are a matter of digital governance, and vice versa. Compliance with the rules is the crucial relation through which digital regulation shapes digital governance.

[41] ibid.
[42] The European Group on Ethics in Science and New Technologies, *Statement on Artificial Intelligence, Robotics and 'Autonomous' Systems*, 2018, p. 17.
[43] L. Floridi, J. Cowls, *A Unified Framework of Five Principles for AI in Society*, *op. cit.*

Despite being necessary, compliance is often insufficient to help society move in the right direction. For this reason, digital regulation and digital governance should be complemented by digital ethics. This is the branch of ethics that investigates moral problems concerning the use of data and information, in order to find morally good solutions, in terms of values and conduct, and shape both digital regulation and digital governance. Such an explanation clarifies why, in 2015, the European Data Protection Supervisor established the Ethics Advisory Group, entrusted with the task of analysing the new ethical challenges posed by digital development and current regulations.

Digital ethics might be understood as hard and soft ethics. Hard ethics concerns values, rights, duties and responsibilities when formulating new regulations or challenging existing ones. In other words, it contributes to shaping or changing the law. On the other hand, soft ethics is post-compliance ethics. It covers the same normative ground as hard ethics, but it does so by considering what should and should not be done *over* and *above* the existing regulation, not against it, or despite its scope.

The more digital regulation is said to be on the good side of the moral/immoral divide, the more it seems easy to exercise soft digital ethics. For instance, a soft ethics approach would not succeed in contexts where human rights are disregarded. However, also in contexts where human rights are respected, a hard ethics approach might be necessary in order to change some regulations that are perceived to be ethically unacceptable.

Soft ethics may provide an opportunity strategy, enabling actors to take advantage of the social value of digital technologies by striking a balance between the precautionary principle and the duty not to omit what could and should be done. It might provide a *risk management solution*.[44]

The risks that digital technologies pose are linked to the intrinsic nature of the digital, which acts by "cutting and pasting" the individual's realities ontologically and epistemologically. This is due to it being a third-order technology, a technology that does not just place itself between the individual and nature, or between the individual and another technology, but rather between a technology and another technology. The level of autonomy and processing

[44] L. Floridi, *Soft Ethics, the Governance of the Digital and the General Data Protection Regulation*, 2018, at
https://doi.org/10.1098/rsta.2018.0081, accessed 14/11/2022.

power that is so reached prevents individuals from having any control over the process.[45]

Furthermore, digital technologies are not merely capable of enhancing or augmenting reality, but they can also radically transform it, creating new environments to inhabit and new forms of agency to interact with. Such a radical transformation may be described by two expressions: "re-ontologisation" and "epistemologisation". Re-ontologisation refers to a transformation of the intrinsic nature – the ontology – of a system, such as a company, a machine, or some artefact. On the other hand, epistemologisation makes reference to an epistemological redefinition of the modern mindset, with its well-established concepts and ideas.[46]

A similar interpretation of some current phenomena may help to observe a transformation of the morphology of agency due to the cleaving power of the digital, which might result in a misunderstanding of such power and its deep, long-lasting impact.

The cleaving power, i.e. the ability of digital technologies to split and recreate realities and ideas, reduces the constraints of reality and increases its possibilities. This makes design the innovative activity that defines the current age, as it is the art of solving a problem by taking advantage of constraints and possibilities in order to meet requirements in view of a goal. Design offers the freedom to build and organise the world in multiple ways.

However, the cleaving power of the digital should not be let shape the world without a plan. It is essential to decide which direction such a power should take, so as to ensure that the information societies that are currently being built are open, tolerant, equitable, just, and supportive of the environment and human development.[47]

[45] Cf. L. Floridi, *The Fourth Revolution: How the Infosphere is Reshaping Human Reality*, Oxford University Press, 2014.
[46] L. Floridi, *The Ethics of Information*, *op. cit.*, p. 29.
[47] L. Floridi, *Digital's Cleaving Power and Its Consequences*, *op. cit.*

4. Personal, Biometric, Digital Identity

The issues concerning identity and AI-related self-determination processes have their roots in the philosophical tradition. A clear example of that is the theoretical-conceptual system of Aristotle's logic of identity,[48] although in modern times not only individuality, but also legal subjectivity is taken into account. Therefore, personal identity can be described as a series of physical, psychological and behavioural characteristics that make each individual unique. This implies three different levels of analysis: a) a descriptive-conceptual level, concerning the definition of personal identity; b) a descriptive-empirical level, aimed at identifying the actors having personal identity; c) a regulatory-axiological level, concerning the recognition of rights.

However, the concept of relevant personal "traits" and "behaviour" in relation to AI has been theorised on the basis of two different approaches, one focused on the identification of the ability to have interests (utilitarianism), the other centred on self-determination (contractualism).

Based on the principle that utility is identified through a cost-benefit analysis, utilitarianism provides a practical interpretation of personal identity.[49] In other words, the minimum empirical requirement linked to personal identity is the ability to have interests, while the maximum empirical requirement is the ability to live by eliminating or reducing one's own and others' suffering.

On the other hand, following contractualism, personal identity characterises independent individuals who, being rational and having developed a conscience, are moral agents that belong to a specific community and may enter into an agreement (a contract) with the other members of the community.[50]

However, despite admitting the importance of personal identity, both utilitarianism and contractualism deny its ontological origin. As a result, personal identity is only guaranteed in terms of self-interest and individual decisions.

[48] According to Aristotle, a person (or a thing) is what it is and cannot be different from what it is; it cannot be anything other than what it is. Therefore, A=A and it is not possible for A to be different from A itself.

[49] Cf. P. Singer, *Practical Ethics*, Third edition, Cambridge University Press, 2011; J. Harris, *The Value of Life*, London, Routledge, 1985; E. Lecaldano, *Bioetica. Le scelte morali,* Roma-Bari, Laterza, 1999.

[50] Cf. H.T. Engelhardt, *The Foundations of Bioethics*, Oxford University Press, New York, 1986.

As the ontological approach considers nature rational, the person is seen as an individual substance, a "natural kind",[51] since it is a living being. Consequently, the characteristics, roles and actions of the human being can be said to be the characteristics, roles and actions attributed to a substantial human being (a subject). The adjective "rational" does not just refer to intelligence and rationality in terms of cognitive, logical and instrumental ability to process and calculate, but it broadly refers to reason and thought, language, communication, relationships, freedom, introspection, and intent.

By contrast, by admitting the variability of personal identity based on either the presence or the absence of some relevant traits or behaviour, the empirical approach makes reference to the fairness of law. The latter should guarantee the free expression of the individual regardless of any ethical theory, becoming an instrument of will or revealing facts. From such a perspective, human dignity is not acknowledged per se, but it is extrinsically attributed by the subject.

The ontological approach to personal identity has developed solid theoretical foundations based on the concept of "human dignity" which, focusing on concepts and categories that do not belong to the legal dimension, such as "substance" and "essence", makes reference to the original identification of "person" with human being, thus re-establishing the foundation and meaning of human rights.[52]

The recognition of the intrinsic dignity of the human being is at the core of the debate over the relationship between philosophical personalism and law,[53] which constantly requires an effective balance to be struck between the theoretical and practical-analytical level. Despite that, the issue remains unsolved in terms of methodological aspects.

In the empirical methodological approach, the relationship between the observer and the observed is non-dialectic, with the subject playing an active role in the investigation and the object remaining passive. Being the only active

[51] Cf. P. Kitcher, *Natural Kinds and Unnatural Persons*, in "Philosophy", n. 54/1979, pp. 541-547; P.A. French, *Kinds and Persons*, in "Philosophy and Phenomenological Research", n. 44/1983, pp. 241-254.

[52] Cf. L. Palazzani, *Il concetto di persona tra bioetica e diritto,* Torino, Giappichelli, 1996; A. Pessina, *Bioetica. L'uomo sperimentale*, Milano, Mondadori, 1999.

[53] F. D'Agostino, *La bioetica, le biotecnologie e il problema dell'identità della persona,* in A. Pavan (ed.), *Dire persona. Luoghi critici e saggi di applicazione di un'idea,* Bologna, Il Mulino, 2003, p. 133.

agent in the relationship, the subject asserts its right to establish the conditions of the object. This shows one of the most fundamental aspects of the empirical methodology, its scientific approach to the study of things, where the most correct definition of "thing" is that of "non-person".

When the observer/observed relationship is established between individuals, it acquires a dialectic nature, with both poles of the relation being recognised as active subjects. In the absence of such circumstances, the relationship becomes of a non-dialectic nature.[54]

The issue of the subjectification of "the observed", and hence the problem of re-establishing a dialectic relationship in the observation and processing of data that are either directly or indirectly linked to human beings, remains problematic. If a socio-humanistic approach characterised by a dialectic nature was adopted, the universe and sample would correlate, giving no valid information in terms of objective sampling.[55] Conversely, if an empirical approach was preferred, the above-mentioned relationship would become non-dialectic, implying a transformation of the "system of persons" into a "system of things". Such a logic has become more popular than it was in the past,[56] and it can only be abandoned by fostering ethical behaviour and obligations that may lead to a plausible – and hence reasonable – level of subjectification. However, when biometrics is applied to AI, things become even more complex.

The high level of social complexity reached by information and communication technology alters the forms of self-determination when, in the shift from the physical dimension of the *habeas corpus* to the digital dimension of the *habeas data*, the body, conscience, identity and behaviour are measured using biometrics and turned into parameters and numbers, thus going back to being "objects" rather than "subjects".

[54] G. A. Maccacaro, *Introduzione*, in F. Salvi, B. Chiandotto (eds.), *Biometria, Principi e metodi*, p. XXV ff.
[55] G. Preite, *Bíos / Mètron. Biometria e dinamiche governamentali*, ESE - Salento University Publishing, Lecce, 2021, p. 47.
[56] Cf. K. Mather, *The Elements of Biometry*, Methuen & Co. Ltd., 1967.

5. Biometrics and Artificial Intelligence: New Perspectives of Analysis

Biometrics is a science,[57] a systematisation of knowledge that can be applied to experimentally verifiable hypotheses. This means that also biometric knowledge, like other forms of scientific knowledge, has developed through simple comparisons and descriptions that have led to generalisation and the formulation of fundamental principles. Biometrics has become a mature science when observations and theories have been transformed into quantitative relations through the application of statistical methods to biological problems. Having later also acquired a qualitative significance, biometrics has started to be considered part of human and social sciences. The shift from quantitative to qualitative analysis has marked a further development of biometric knowledge, as it has led to generalisation on a social level.[58]

In the fields of information technology and AI, biometrics is also described as the automated recognition of a "digital human body".

On a practical and analytical level, the biometric approach makes reference to the identification of a person by using their own unique, distinctive characteristics, which may be divided into physiological and behavioural biometrics. Physiological biometrics are based on measurements related to bio-physical characteristics of the human body, including fingerprints, facial features, the iris, the retina, and the hand geometry. On the other hand, behavioural biometrics are based on data related to the unique, distinctive patterns of behaviour of a person, which include their walking rhythm, gestures, and facial expressions.[59] With the development of the internet and the spread of digital behavioural patterns, in terms of literary and musical preferences, online purchases, and the like, there has been an increase in the scope of the technological design on which AI is based.

[57] G. Montecchi, F. Venuda *Manuale di Biblioteconomia*, Milano, Editrice Bibliografica, 1999, pp. 124, 243. In the Dewey Decimal Classification (DDC), *biometrics* is considered together with *biostatistics* (*DDC: 574.015195*) in the *Natural Sciences and Mathematics* section (*DDC: 500*), in the *Life Sciences* division (*DDC: 574*), in the *Philosophy and Theory* section (*DDC: 574.01*). See John P. Comaromi et al. (ed.), *Dewey Decimal Classification and Relative Index*, 20th edition.

[58] G. Preite, *Il riconoscimento biometrico. Sicurezza versus privacy*, Editrice Uniservice, Trento, 2007, pp.15-20.

[59] G. Preite, *Politica e biometria. Nuove prospettive filosofiche delle scienze sociali*, *op. cit.*, pp. 88-89.

Complex systems might greatly benefit from the application of biometric methods, which may meet their need for control, protection, effectiveness, efficiency, interoperability, and interconnection. This becomes particularly significant when decisions, actions and consequences impact safety in a number of key areas, which may go from the personal to the financial sphere, from healthcare systems to ethnic factors, from food to environmental issues, from climate change to local aspects. However, such decisions on safety might turn into general instruments of control.

The General Data Protection Regulation of the European Union (GDPR 2016/679) has introduced the principle of accountability, which requires any subject to take responsibility for the way in which they process personal data. Unfortunately, this principle has been developed to make human beings – rather than machines – accountable. The ethical and legal issues that are arising from such a situation seem to highlight the need for a broader reflection on artificial intelligence also in terms of accountability.

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