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# Ecology of Artificial Intelligence. Media, Education and Health

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The ecology of Artificial Intelligence could be an interdisciplinary field of study that takes as its object the expressive forms of human culture, starting from its systemic dimension. According to this approach, as in the study of 'old and new' media, AI could also be conceived as an environment capable of influencing human perception and knowledge, emotions and values, a space in which individual and social experiences can take place. The following reflection attempts to reflect on a rich and complex topic from a historical and scientific point of view: that of Artificial Intelligence. Specifically, the characteristics and role of AI in contemporary society will be considered, as well as the implications and links of this new technology, capable of imitating human intelligence, on media, education and health. Will what we call (perhaps erroneously) AI become our cognitive/communicative and social collaboration environment?

*Keywords:* AI, digital culture, relation, education, health

## Introduction

The multifaceted attention paid to Artificial Intelligence (AI) in recent years is not the result of an overestimation or excessive interest in this new technology.

The increase in computing power and data availability, the progress in algorithms have made AI the strategic resource of the twenty-first century, at the centre of the fundamental dynamics for the functioning and survival of new and old democracies. From transport to medical activities, from education to public services for citizens, AI can have a very significant impact on the social and economic order of the world (Berman, 1992; Bechmann & Bowker, 2019).

It is no exaggeration to say that a kind of global challenge is underway.

Just as in the forties of the last century there was the race to research the atomic bomb and, in the sixties, there was the great challenge to conquer the moon, today the superpowers are trying to prevail in the use of innovative technologies in every social sphere, private and public, and AI undoubtedly plays a major role (Boyd & Holton, 2017). This is why, in 2018, the European Commission recommended to the Member States a synergistic action to face the new challenges by preparing a European strategy for AI, within which significant investments are foreseen to deepen the areas that are undergoing the greatest changes as a result of new technological infrastructures (Bucher, 2018; Elliott, 2019a).

Any attempt to regulate such a recent and widespread phenomenon requires an examination not only of the opportunities but also of the risks that AI will entail at the social, economic and legal levels, as well as of the profound psychological, anthropological, cultural transformations and ethics (Brynjolfsson & McAfee, 2014).

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In this perspective, and in view of the development of a sometimes too stereotyped dialectic between technophiles and technophobes, the following contribution aims to discuss the effects and relationships of this new technology capable of imitating human intelligence, focusing on some areas such as those of media, education and health.

The approach will be ecological.

This means that we will not limit ourselves to following, in an often-naive way, the footprints of technological progress or the laws of the market, but we will try to address the issue by trying to "react" to the techno-information saturation of our times and our vital spaces. Perhaps it is time to stop the 'social' and technical frenzy and reflect—observe—what our avatars or nicknames tell us about ourselves as human beings.

An interdisciplinary view, then, precisely because we all live in symbolic and technological environments that both modify and are modified by human action, in what experts have so far called the mediosphere, where the media are of capital importance, being one of the main means of communication.

Starting from this concept, we will try to describe a new techno-media ecosystem and its role today: that of the AI ecology.

## Hybrid Systems

For sociologists and media sociologists in particular, the emergence of artificial intelligence and the "new machines" represents a profound questioning of the very object of their disciplines.

A problem that has been emerging for several decades, with the onset of digitalisation and the consequent convergence of means of communication, which have become increasingly indistinguishable. Now, however, there is a clear acceleration, as if the media were undergoing a further transformation that requires new approaches and raises unprecedented questions (Collins, 1990; Elliott, 2019b; MacKenzie, 2019).

They range from the algorithms that drive search engines, starting with Google, to social platforms like Facebook or Instagram, to Amazon.

These highly sophisticated "software environments" are constantly analysing user behaviour, merging the data they themselves disseminate, aggregating it into more defined profiles, and are able to offer appropriate content to each individual connected user (Kaplan, 2016; Lardieri, 2018). This model represents a rather radical change compared to so-called relationship marketing, as it automates some steps traditionally entrusted to humans.

An example of this is the fact that communication agencies, in charge of planning an advertising campaign for their client or company, are increasingly involved in making the algorithms talk to each other. After identifying the main objectives to be achieved in order to optimise the effectiveness of the advertising, the artificial system "reads" the objectives so that they coincide with the client's needs (Broussard, 2018; Marres, 2020a; 2020b).

Another, more recent example is television platforms such as Amazon Prime or Netflix, which suggest titles to their subscribers based on what they have already watched. In order to do this, the algorithms break down their products into genres and sub-genres, plots, settings, episodes, and constantly monitor the user's choices. We are faced with a veritable observation and planning machine, capable of satisfying any economic or anthropological need and increasingly reducing the risk of failure (Turkle, 1984; Berman, 1992; Beverungen, 2019).

If the benefits for companies that produce content and simply provide services and aggregate their users' data are obvious, the risks that these practices pose to networked audiences are currently much less clear.

To understand this point, it may be useful to look at the world of advertising and fiction as well as that of information.

When the algorithms of a social network aggregate the information that they signal to a user on the basis of his or her orientations, there is a risk that the user will find himself or herself in that cognitive state that Parisier (2012) has called a "filter bubble", i.e. a bubble in which the individual user sees only what he or she wants to see or know.

This techno-cognitive state means that one's conditions remain closed in one's own biases and are reinforced over time, never questioned, accompanied by representations that are completely different from reality (Cave, Dihal, & Dillon, 2020; Clark & Gevorkyan, 2020).

The discourse is therefore easily applicable to our new "platformised" world.

The platforms that produce, host and record our media experiences are equipped with communication and relational systems that are increasingly similar to those of humans. They understand our words, they address us in natural language, they make it possible to establish a simple but increasingly effective, easy and pleasant conversation, at least at a first level (Turkle, 1984; Spencer, 2017; Noble, 2018).

Therefore, before going into details and understanding how this scenario can be applied to the topics of education and health, two first and simple conclusions can be drawn from this brief review of the literature.

The first is that hybrid systems have emerged between media, robots and artificial intelligence, changing the traditional definition of media. One could try to identify a first step in the evolutionary process of information technologies, before the birth of AI, that of the media machine, for example.

But beyond individual definitions, it is clear that observing their development (and behaviour) will be the most important task (and objective) of media research in the coming years.

The second is that media machines are born under the banner of progress, which immediately presents some little known sides, and it will be up to individual citizens and political institutions to carefully follow and standardise this unprecedented ecosystem in its evolution, for the protection of users and the common interest (see Figure 1).

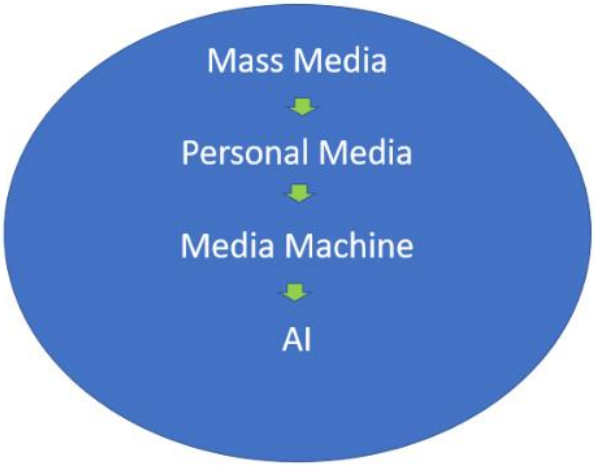


*Figure 1*. Towards AI system.

## Algorithmic Education

The Turing test seemed to be the horizon against which the dreams of the advocates of artificial intelligence would crash. This test sanctioned the insurmountability of the human brain by machines, i.e. the impossibility for a computer to reproduce human thought.

At present, the AI programme is experiencing a marked recovery in very specific areas that affect the whole of society and several generations.

This is due to the new types of algorithms that are capable of learning from experience, which at the same time resize and re-launch the promises of the first season of research on intelligent machines (Bourdieu, 1975; Fleck, 1987; Berman, 1989; 1992; Forsythe, 1993).

They resize them because AI is not materialising in humanoids, as they have so far been represented in cinematic imagery, but rather in services and functions built into ‘goods’ and commonly used objects: from personal digital assistants to the various kinds of smart things (Crogan, 2019; Collins, 2018; Dewan, Murshed, & Lin, 2019). At the same time, these promises are also being decisively redefined, so that the new AI no longer envisages the development of expert systems programmed to perform precise tasks (limited AI) but contributes to the birth of artificial life forms capable of modifying their own algorithms, or autopoietic systems capable of influencing their own evolution, using computational speed to drastically reduce waiting times for new releases (general AI).

But how does all this challenge the various sectors of society, such as education?

Two trends can be identified now.

The first has to do with machine learning.

The current situation is characterised by increasing entropy and unsustainable complexity.

Available information mixes and intermingles with everything we call “information”, from our online conversations to the data we produce by interacting on social networks, making knowledge increasingly less totalisable (Elliott, 2019b; Eubanks, 2018; Eynon & Young, 2021). The selection and evaluation of data is becoming more and more complicated, but in this sense algorithms come to our aid: they learn from our research, they follow our digital tracks, they get to know us better and better, they unravel the complexity for us by suggesting the choices to be made.

On the basis of the information available, the trends and the choices made, it is possible to build an educational path and, at the same time, a meta-critical work whose forms must be imagined for a new media education compatible with the challenges of the age of the code (Buoncompagni, 2018a; 2023).

A new approach to media education, which no longer includes only exercises on data, but which must address the suggestions that devices leave us with and in the data.

In this respect, a partial response can be found in educational robotics, which represents the current outcome of a series of practices that lead from coding to making—tinkering.

Born in the cultural broth of counter-information and hacker ethics, these instances react against the surveillance homologation imposed by the dictatorship of formats and scripts (Andrejevic & Selwyn, 2020; Monahan & Torres, 2010).

Mass consumption of social computing is widespread thanks to the simplicity of interfaces and the ease of use of formats.

This has meant separating the moment of uploading content from that of compiling, formatting and aesthetically rendering it. A complete delegation of tasks to the machine, and this for the sake of ease of operation, at the expense of creativity and critical awareness in use (Kaplan, 2016).

The second trend, observed by Tegmark (2017), Professor of Physics at MIT in Boston, is that the difference between humans and machines has always been based not so much on intelligence (a machine can even be more intelligent than an individual), but rather on consciousness.

A machine, or a technological system in general, knows its limits and tries to remove them by intervening in the algorithm with which it was designed to generate new, more perfect versions of itself. It just seems to be somehow endowed with consciousness, with reflexivity.

Never before have the organic and the artificial been so close to the point of confusion.

The risks, as with all technologies, are undoubtedly present, but training in the techno-educational system of the new machines is necessary and can reduce the dangers and at least make it possible to imagine a peaceful co-evolution of intelligent technologies (McStay, 2018).

If, as mentioned above, the algorithms learn and tend to improve, there may be room for educational intervention in this process (see Figure 2).

A less technical education, but certainly an intelligent one, and therefore critical and aware of digital information.

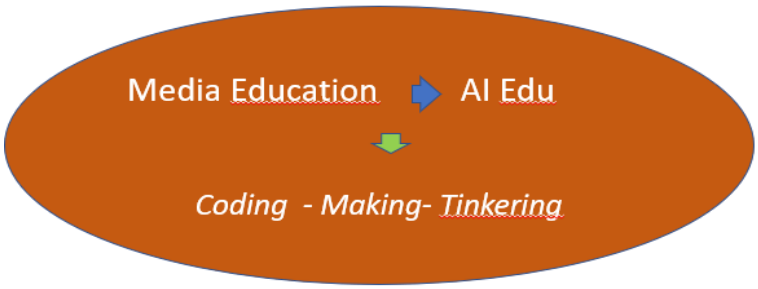


*Figure 2.* Media-AI education.

## Medicine and Health in AI

Another area that will certainly attract the attention of researchers, institutions and citizens is that of medicine and health in general. Especially after the Covid-19 pandemic, where there have been numerous cases of infodemic, hybrid surveillance, reflexive and ideological polarisation, verbal and physical conflicts between citizens, media and politicians, vaccinated and unvaccinated (Buoncompagni, 2020).

The arrival of the new virus in our lives has revolutionised not only the daily life of each one of us, but also the functioning of our social, technical and information systems. Faced with the Covid-19 epidemic, which soon became a pandemic, the whole of society was reorganised, restructured and readapted.

This started with (digital) language, a social product par excellence, which suddenly became much more medicalised (Maturo & Conrad, 2009). In fact, new surveillance mechanisms are constantly expanding, vaccination cards are becoming mechanisms of inclusion and exclusion, distance learning and teleworking have become habitual practices.

Increasingly sophisticated computerised systems have been used for decades in the clinical diagnosis of neurological diseases and the study of brain function. In recent years, home automation applications have been

tested in cases of very severe neurological pathologies that do not allow the patient to turn off a switch, move freely between different contexts or eat independently (Obermeyer, Powers, Vogeli, & Mullainathan, 2019). The robotic (or artificial) hand is an example.

In medicine, as in other fields, there are no good or bad scientific discoveries. What is good or bad is the application by the user.

A complex artificial system, as mentioned above, is capable of learning autonomously, of memorising an important amount of information beyond the capacity of the human brain, of recalling it in a very short time and of making a final decision.

It is therefore understandable that a "neural network", or a more general computerised analysis system, will always be faster, more accurate, less prone to error and less distracted than a human (Beer, 2017; Belfield, 2020). For this reason, it is reasonable to assume that it will play an increasingly useful role in diagnostics, whether it is images or data organisation patterns.

AI guides and manages not only platformised environments, but also medicalised ones.

Human supervision and validation will still be required. In the event of a malfunction, it will be up to the individual to identify and correct the error, avoiding harmful effects on human health (Obermeyer et al., 2019).

In the health sector, one of the aspects that concerns the global medical-technological revolution is the role of robotics in active ageing (Ito, Ito, & Suteu, 2020).

In fact, several new generation anthropomorphic robots have recently appeared on the market, which are not limited to performing tasks, but are able to activate interactions and social relationships with other robots and with human subjects. These are called Socially Assistive Robots (SARs), which are used to interact socially with people and also to help them manage their physical and psychological well-being.

Their increasing proliferation has opened up a new line of research, psycho-robotics, whose main objective is to understand the dynamics of social interaction generated by the encounter between humans and robots, both from the point of view of the characteristics of the interaction and that of its design (see Figure 3).

For Masahiro Mori, this similarity does not produce positive results from a social and emotional point of view: the more the robot is seen as 'human', the greater the disappointment one feels when the interaction is not as effective as the human one. In fact, the inability of social robots to live up to the expectations of older people generates a sense of anger and disappointment like that felt towards a partner who has betrayed us (Obermeyer et al., 2019; Ito et al., 2020).

Artificial intelligence in this case is one of the various robotic technologies that are used, for example, in production systems to automatically manage processes that would otherwise have to be managed by humans, but without the benefits that these technological systems offer. For example, greater safety, shorter times and greater control. Artificial intelligence therefore not only replicates the functions of the human mind but, thanks to robotics, is able to enhance and increase its capabilities and potential.

At the same time, robots would be "simple automatic machines" whose potential is instead enhanced by artificial intelligence systems.

This reflection clearly shows that even a strictly technological field such as robotics, when it enters the field of communication and social interaction, necessarily requires the intervention of the human sciences in order to understand the processes to be reproduced and the strategy to be adopted. For this reason, the best strategy to achieve this goal is the creation of multidisciplinary research groups dedicated to the study of human-machine interaction, integrating the skills of several disciplines.

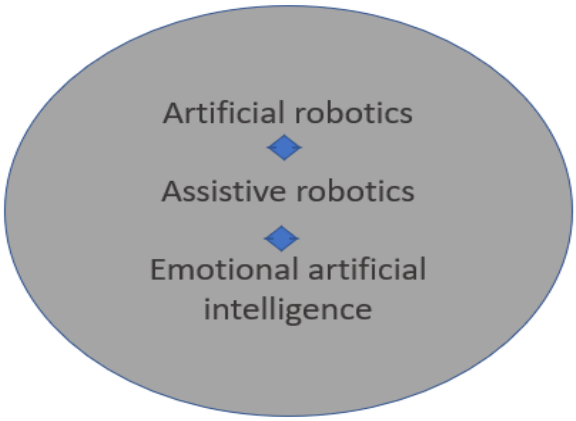


*Figure 3.* AI-robotics in health.

## Conclusions

From what has been said so far, it is clear that the ecological perspective on AI allows us, first of all, to understand the point of observation and the perspective in which we are moving.

We can simply look with amazement and wonder at the enormous progress that is being made thanks to information technologies, computers, machines, to the point of hypothesising competitive situations or even the overcoming of some human capacities. Or see this undeniable progress in the context of a confrontation with the human being, understood in all its breadth and potential, which is not reducible to the capacity for calculation and technical operativeness alone (Brynjolfsson & McAfee, 2014; Bucher, 2012).

In the Bible, we find this description linked to the creation of man in Sirach (17:6-7):

> He gave discernment, tongue, eyes, ears and heart to think.
> He filled them with knowledge and understanding, showing them good and evil.

What has been reported in relation to the current ethical debate on AI is not so far off.

It is particularly useful to consider the context in which the technology is developing and in which the individual is placed as a composite and complex being that cannot be reduced to a single component.

Faced with the penetration of technology, the individual is called to cultivate an interdisciplinary ecological view of the world in transition, also through awareness of the power dynamics at play, in order to generate a critical approach, a reflective thought (Bucher, 2018; Buoncompagni, 2018b).

The great risk that can be seen in the engineering of information flows and existential processes has to do with data manipulation, mystification and violence. Sustainable participation in the management of common goods and the exercise of active and conscious citizenship are never self-evident, on the contrary, they now seem more than necessary. In the face of utilitarian and opportunistic conceptions of human behaviour, the ecology of AI is an ecology of integral human development.

It means knowing and controlling context, knowing how to ‘place’ and knowingly relate to the new technological ecosystem.

Intelligent machines are too hastily ascribed capabilities that are truly human. Artificial devices that simulate human capabilities seem to lack “human quality”.

It is therefore necessary to take them into account, to direct the regulation of their use and scientific research itself towards an increasingly constructive and fair “interaction” between individuals and machines, to

face inequalities and conflicts responsibly, and to educate present and future generations in this matter.

Finally, a question seems necessary.

Will what we (mis)call AI become our general environment of cognition and communication?

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