

EMOTION AND LEARNING, ALGORITHMS AND ETHICAL FORGETTING. A NECESSARY REFLECTION IN THE AGE OF DIGITIZATION

EMOZIONE E APPRENDIMENTO, ALGORITMI E OBLIO ETICO. UNA NECESSARIA RIFLESSIONE NELL'ERA DELLA DIGITALIZZAZIONE



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ABSTRACT

We are living through a season of a strong push for the digitization of educational processes, of a development of digital culture in which AI applied to the educational field is, undoubtedly, a priority area that challenges the theoretical and methodological assumptions of Educational Technology demanding a redefinition of it. One of the most debated topics concerns "Affective Computing" a multidimensional and multidisciplinary approach centered on emotions and the possibility of machines or robots acquiring the ability to perceive, express and generate emotions useful to support learning processes. Such research, which is based on the subject's facial expressions and muscle movements, is perhaps the most typical expression of human beings and requires ethical and legal reflections about possible privacy violations. This article aims, on the one hand, to analyze the risks and critical issues related to a possible uncontrolled dissemination of these personal data on the other hand, to reflect on the educational paradigm that attends emotional human learning and the capabilities of algorithms.

Stiamo vivendo una stagione di forte spinta alla digitalizzazione dei processi di formazione, di uno sviluppo della cultura digitale in cui l'IA applicata al campo educativo è, indubbiamente, un settore prioritario che mette in discussione i presupposti teorici e metodologici dell'Educational Technology chiedendone una ridefinizione. Uno dei temi più dibattuti riguarda l'"Affective Computing" un approccio multidimensionale e multidisciplinare centrato sulle emozioni e sulla possibilità che le macchine o i robot acquisiscano la capacità di percepire, esprimere e generare emozioni utili a supportare i processi di apprendimento. Queste ricerche, che si basano sulle espressioni facciali e sui movimenti muscolari del soggetto, sono forse l'espressione più tipica dell'essere umano e richiedono riflessioni etiche e giuridiche circa le possibili violazioni della *privacy*. Il presente articolo si propone, da un lato di analizzare i rischi e le criticità connesse ad un'eventuale diffusione non controllata di questi dati personali dall'altro di riflettere sul paradigma educativo che associa l'apprendimento emotivo umano alle capacità degli algoritmi.

KEYWORDS

Digital Education, Artificial Intelligence, Learning, Privacy
Educazione digitale, Intelligenza Artificiale, Apprendimento emotivo, Privacy

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Introduction¹

Artificial intelligence (AI) is now constantly present in all spheres revolutionizing the way humans interact with all classic daily activities. Being able to fully assess the risks and opportunities of a tool that is as ingenious as it is potentially dangerous is, in fact, already an arduous task. The world transforms, adapts, is shaped also and above all in relation to technological innovations which affect, inevitably, also in the affirmation and constitution of the individuality of the human being. To contextualize to didactics, it is probably appropriate to note that even schools and learning systems are, today, the subject of a harsh offensive due to the advance of these so-called generative artificial intelligences, and to establish the boundary between natural evolution, severe technological change and the abandonment of traditional learning structures is a very complex and delicate matter. A growing international scientific literature points out that AI applied to the field of education and training is an emerging and priority area that challenges the theoretical and methodological assumptions of Educational Technology, calling for its redefinition (Panciroli - Macaudo, 2021; Baker - Smith, 2019; Hinojo-Lucena - Aznar-Díaz - Cáceres-Reche - Romero-Rodríguez, 2019; Luckin - Holmes - Griffiths - Forcier, 2016; Pedró et alii, 2019). For more than three decades now, AIED has been the subject of a debate increasingly characterized by an expanded interdisciplinarity, from cognitive neuroscience to the sociology of communication, from psychology to computer science. The goal is to promote the development of adaptive learning environments and other AIED tools-flexible, inclusive, personalized, engaging, and effective-exploring their educational potential (Educause, 2019; Zawacki-Richter, Marin - Bond - Gouverneur, 2019). The interaction between artificial intelligence tools and teaching methods must be monitored, follow guidelines, but most importantly, make all school stakeholders - students, parents, teachers, and principals - participate in the process.

The gradual incorporation of digital and artificial intelligence tools cannot and should not be seen only as a negative. The possible personalization of learning with the help of AI to enable students to learn more efficiently must be welcomed, as must the possibility of supporting teachers through artificial machine support to build and organize lessons or to conduct assessments, monitor and analyze student

¹ For evaluation purposes, Angelina Vivona should be credited with writing the introduction and conclusion sections, Guido Scarano with writing paragraphs 1 and 3, and Piera Tuccillo with writing paragraphs 2 and 4.

progress. Such tools, integrated in the right direction and guided by human will, can enrich the modes of teaching and learning.

The role of the teacher encompasses a number of inescapable initiatives that render the concern, though understandable, about the possibility of technology replacing the teacher's professionalism devoid of objective foundation.

The teacher's function involves the transmission of knowledge through human relationships and thus social and collaborative learning. It also provides for constant iteration with students, development of critical thinking, growth of values and realization of students' character, all encouraged by the support of teachers.

It seems self-evident that the implementation of these activities must be followed by ad hoc regulations to defend the integrity of sensitive data and to ensure that use is done in accordance with ethical values.

Education that evolves, adapts, transforms, and involves automated systems is not utopia, but it is necessary to control and guide this change in order to envision a school that is inclusive, accessible, and at the same time secure. The National Digital School Plan (PNSD), launched in 2015 by the Ministry of Education, University and Research (MIUR), already highlighted the importance of a transition into a digital and innovative school in order to provide students with new keys to the future. Today almost 10 years have passed since PNSD, it is necessary to continue to adapt to technological evolutions, remaining faithful to traditional learning tools but managing to integrate them with new and cutting-edge forms of teaching.

1. AI in education between humanity and algorithms: the challenges of emotional learning in the age of Affective Computing

Despite the progress and promise, it is critical to address the ethical and pedagogical challenges associated with the use of educational robotics and AI in education. In particular, a significant gap has been revealed between the emotional aspect of human learning and the capabilities of algorithms. Indeed, machines demonstrate extraordinary intelligence, with a mastery of mathematical language and impressive computing power. Paradoxically, the very perfection of intelligent machines is also their weakness: they lack the emotional component that characterizes human beings. They are excellent at computation and analysis, but

they lack that empathic capacity and emotional awareness that makes the human experience so rich and complex.

Important areas of synergy emerge between social and emotional learning. Indeed, in learning processes, emotional competence, which brings together emotional, social, cognitive and affective development, has an impact. Wanting to conceptualize, emotion lies at the base of social and cognitive processes and allows us to investigate the role of social functions of emotions and how they assume relevance in everyday relationships, interpersonal exchanges and in all processes of skill acquisition and modification.

Thus, emotion is placed at the basis of all social processes by being able to increase self-awareness, self-management, empathy and psycho-social skills and also promotes the evolution of personal development and school performance. These two fields, though developed independently, combined could constitute innovative and profound changes in education.

"Emotional intelligence is the ability to recognize, understand and manage one's own emotions and those of others." According to the theories of Daniel Goleman, Reuven Bar-On, Peter Salovey and John Mayer, emotional intelligence is characterized by self-awareness, management of emotions, consideration of others and aptitude in managing relationships.

In fact, teachers, in order to enter teaching, must have developed a sufficient degree of emotional intelligence to be able to understand students' needs and ensure the establishment of a positive environment. In this direction, teacher training must include integrated programming capable of allowing the development of skills and tools to manage technological and methodological evolutions.

Currently, one of the most debated issues concerns the possibility of machines or robots acquiring the ability to perceive, express and generate human emotions and feelings. This phenomenon is known as "Affective Computing" and is a branch of Artificial Intelligence that focuses on the analysis and development of computational tools capable of recognizing, expressing, and generating typically human emotions. These tools are based on what is called the "Emotional Algorithm," which is essentially a mathematical formula for identifying and evaluating various human facial expressions and movements. Interestingly, these tools have recently been used in some European schools to analyze students'

emotions, thus providing an indication of teachers' performance. However, because this analysis relies on facial expressions and muscle movements, it involves the processing of biometric data, i.e., personal information that can specifically identify an individual and provide details about his or her personal identity.

2. AI challenges in privacy: the balance between technological innovation with personal data protection

The 21st century has brought a new perspective on the analysis of personal data, highlighting their ubiquity and cross-cutting importance in every jurisdictional, national and supranational sphere. These data, referring to the natural person, are present in various forms and measures in everyday life, giving rise to aggregations of massive data (the big data) which can generate completely different results from those obtained from the analysis of a single piece of data. This data can be handled in different ways-consciously or unconsciously, extensively or limitedly, securely or not-by third parties than the individual to whom it belongs.

What is meant by "personal data"? The GDPR defines personal data in Article 4 as follows: any information relating to an identified or identifiable natural person; an identifiable person is one who can be identified, directly or indirectly, by reference in particular to an identifier such as a name, an identification number, location data, an online identifier, or to one or more characteristic features of his or her physical, physiological, genetic, mental, economic, cultural or social identity. The concept of identifiability, in its facets and possible sources, and the reference to online immediately leap to mind. Any element of a person's life can be a source of identification, whether it is related to his or her cultural, social, economic, psychological, physical conditions, or online presence. Such identification can occur through IP numbers, online service accounts, web interactions, or information provided by virtual service providers. A person's location and labels associated with him or her, such as a social security number or biographical name, may also enable identification. Under the GDPR, any information about a natural person can be considered personal data, regardless of its nature.

Moreover, the GDPR applies only to personal data of natural persons, especially citizens of the European Union. However, its scope is global, ensuring that the

fundamental rights and freedoms of natural persons are protected, even beyond the borders of the Union. This makes the GDPR an important pillar in the field of personal data protection, similar to the protection of fundamental personal rights.

3. The deep integration of Big Data and Artificial Intelligence

As for artificial intelligence systems, these require vast amounts of data to function optimally. The vast digital network (reaching 65 percent of the global population and connecting over fifty billion devices) generates huge amounts of data, becoming a valuable resource that fuels the data-driven economy. The integration of big data and artificial intelligence is a significant source of prosperity. Data are collected and analyzed by algorithms that extract crucial information, enabling digital enterprises to accurately predict the needs, opinions and preferences of people in every sector. This enables them to offer large-scale products and services that are increasingly customized to meet individual needs. Big data generates value through data analysis, mainly for marketing purposes, leveraging digital platforms that facilitate connections and exchanges, while digital advertising is gradually replacing traditional methods. Data, therefore, is likely to be used and exploited simultaneously and in different places by an unlimited number of parties, although access to it may be limited by technology or law. Data, moreover, are not exhaustible and are generated at exponential rates: currently, on average, each human being connected to the Internet has a digital footprint, i.e., the trail of data left on the Internet, of 200 MB per day. Fundamental moment for the operation of an artificial intelligence system, therefore, is the data collection phase. In this regard, the Artificial Intelligence Regulation does not deal with the collection and processing of data, which therefore remain subject to the existing instruments and, in particular, to Regulation 2016/679, on the protection of personal data (often referred to by the English acronym, GDPR). Once data have been collected, however, it remains to be clarified what regulations apply to them once they are entered into the system. The European Commission, in the explanatory memorandum accompanying the proposed AI regulation, clarifies that it "is without prejudice to the General Data Protection Regulation (Regulation (EU) 2016/679)." Therefore, it is reasonable to say that both regulations should be applied cumulatively. Moreover, several textual elements of the proposed AI regulation seem to confirm this conclusion. For example, Recital No. 24 emphasizes that when it comes to the collection of biometric data (i.e., data relating to an individual's

physical, physiological, or behavioral characteristics that allow for the unique identification of a person), it is essential to comply with all the requirements set forth in Article 9(1) of Regulation (EU) 2016/679.

4. The Shadows of Innovation: risks associated with the processing of genetic data, biometric data, and health-related data

Regarding the identification of the data controller, artificial intelligence systems often assume the operation of a series of detections made through different tools, such as acoustic sensors, cameras, facial recognition technologies or other connected objects capable of sensing and processing data. The system access elements capable of collecting data are, therefore, necessarily multiple and diverse and not easily assimilated into a unified figure, considered the owner of all legal situations related to the use of personal data.

However, the problematic aspect of this phenomenon concerns the data "collection" phase, which is subject to the principles outlined in Articles 5 and 6 of the GDPR. These provisions stipulate that data collection should be done with the utmost respect for information minimization and only with the explicit consent of the individual concerned. The principle of minimization requires that only data that is strictly necessary for a specific purpose be acquired and that it be deleted once processing is concluded; while the principle of consent is the fulcrum around which the individual's rights in protecting his or her personal data revolve.

We see, in fact, that data include personal data, which is information that identifies a natural person and, when taken together, delineates his or her digital identity. They constitute, first and foremost, the subject of a person's right, as such unavailable, imprescriptible and absolute. Hence their protection traditionally devolved to privacy law.

Anyone who uses computer services through devices such as smartphones, tablets or computers has now realized that consent to the processing of personal data often seems to have little meaning. When one wants to use an online service, it is common to simply have to check a box to give one's consent to the processing of personal data, without detailed explanation or real choice.

In fact, according to the European Union's General Data Protection Regulation (GDPR), consent is not always necessary to process personal data lawfully. For

example, if the processing is necessary for the pursuit of a legitimate interest of the data controller or a third party, consent may not be required.

However, there are exceptions for some special categories of personal data, such as those relating to race, political opinions, or health. In these cases, the data subject's consent is usually required before proceeding with the data processing, unless there is another legal basis provided by law.

In addition, the GDPR no longer requires notification to the supervisory authority before starting the processing of sensitive data. This reflects a change in perspective on the protection of personal data from a view in which the data subject was considered the owner of his or her own data to an awareness of the need to balance the right to privacy with the public and commercial interest in the movement of data.

Thus, while consent remains important in many cases, the main responsibility lies with the data controller, who must ensure that the processing is carried out in accordance with the principles of lawfulness, fairness and transparency, limiting it to the specific purposes specified.

In essence, the GDPR is based on the principle of empowerment of the data controller, who must demonstrate that he or she has taken adequate measures to manage the risks associated with the data processing. If the processing involves particularly sensitive personal data, as specified in the 51st recital of the General Data Protection Regulation (GDPR), security measures must be extremely stringent. These data include genetic information, which provides unique details about a person's health and physiology.

Genetic information not only uniquely identifies an individual, but can also predict possible future health conditions, both for the person themselves and their relatives. This could influence the decisions of insurance companies or employers, who might discriminate or make decisions based on this information. For example, insurance companies might deny coverage or charge higher premiums for individuals with a genetic predisposition to certain diseases. Employers could select employees based on their genetic resistance to certain working conditions.

The supranational legislature, therefore, seems to sense the high level of danger in the processing of these data even with respect to the broader category of so-called special or sensitive data: genetic data, biometric data, health-related data - the legislature almost seems to want to say - are more special than the others and,

therefore, deserve greater protection, even at the expense of the princely objective that the European Union set itself in adopting Reg. EU 679/2016, namely to achieve homogeneity throughout the Union of the rules on the processing of personal data.

As for facial recognition, the latter has been spreading rapidly in recent years in both the private and public sectors. From object and person detection, to access control to public and private buildings; from group demographic analysis, to emotion analysis. The face can be used to unlock the smartphone, can be detected by CCTV cameras to enter offices or gyms, or to speed up e-boarding procedures at many airports. Of facial recognition there are known uses for commercial purposes, for example to record customer liking levels in so-called emotive marketing, and also in the human resources sector where it can be used to identify, during a job interview, specific characteristics of the person for the purpose of recruitment.

Even in public administration, facial recognition is widely used today: from schools, public housing, transportation to the public safety sector (in the species of public order, immigration and asylum). In education, for example, in Sweden and Marseille, facial recognition has been used to control and monitor student and visitor access to schools and to quickly identify potential security risks. Again, facial recognition techniques have been used to check attendance, assess students' attention or emotional state, and monitor their exams. The widespread adoption of these technologies, as well as others based on artificial intelligence, offers numerous benefits, increasing safety levels and making public services more efficient. However, it also raises important ethical and legal issues, particularly regarding privacy and the risk of abuse.

Conclusions

The central issue relates to possible violations of privacy and the fact that data acquisition takes place without the consent of the data subjects, often, indeed, without their knowledge. Weighing on the solution of these problems is the lack, in most jurisdictions, of an organic regulation of the subject. In fact, facial recognition, like other emerging technologies turns out to be, at present, a poorly regulated phenomenon, both in terms of its uses by private individuals and its uses in the public sector. The search for an equitable balance between the benefits of new technologies, especially in the public sector, and the risks associated with them has been guided, in the absence of specific regulation, by judges and independent authorities that have relied on general principles of law and the provisions of the

GDPR in Europe. These principles include proportionality, transparency, and respect for the legal process.

One of the first cases involved the use of automatic facial recognition by the Wales Police. Initially, the court had ruled that the use of the technology was lawful, but the Court of Appeal later ruled that such use was unlawful, pointing to shortcomings in the legal framework and policies adopted by the police. National privacy watchdogs have also scrutinized the use of facial recognition, for example in Italy and Canada, fining companies for non-consensual collection of biometric data.

Consent has been a key issue, with China's Supreme People's Court ruling that the collection of data through facial recognition for commercial purposes requires the individual's consent. However, in contexts such as schools, where consent may not be free, concerns have been raised about the legitimacy of using such technologies.

In general, new technologies are changing the way public authorities operate and interact with citizens. Although they offer significant benefits, it is essential to regulate them in a way that ensures that fundamental rights are respected and the balance between public power and citizens is maintained.

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