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DOES ARTIFICIAL INTELLIGENCE ENDEAVOR TO REPLACE HUMAN ACTIVITY IN AN EDUCATIONAL CONTEXT?

New algorithm technologies are permeating every aspect of daily life facilitating utility services, as well as providing more advanced security systems. While it is true that Artificial Intelligence (AI) can offer great opportunities, at the same time it is a priority not to underestimate the profound changes that will affect society as a whole and the concerns resulting from them. Within the world of education there is still no widespread application of these techniques: an endeavour should be made to exploit the potential of machine learning techniques to facilitate teachers in analysing the learners' problem-solving process.

Key words: artificial intelligence; education; online interaction; fields of application; future.

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СТРЕМИТСЯ ЛИ ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ ЗАМЕНИТЬ ЧЕЛОВЕЧЕСКУЮ ДЕЯТЕЛЬНОСТЬ В ОБРАЗОВАТЕЛЬНОМ КОНТЕКСТЕ?

Новые разновидности алгоритмов проникают во все аспекты повседневной жизни, облегчая пользование услугами, а также обеспечивая более совершенные системы безопасности. Искусственный интеллект (ИИ) открывает большие возможности, но в то же время нельзя недооценивать значительные изменения, которые затронут общество в целом и связанные с ними проблемы. В сфере образования до сих пор нет широкого применения этих технологий: необходимо попытаться использовать потенциал методов машинного обучения, чтобы помочь учителям в анализе процесса решения проблем учащимися.

Ключевые слова: искусственный интеллект; образование; онлайн-взаимодействие; сферы применения; будущее.

Introduction. We live in a world increasingly connected and permeated by digital technologies and devices. As Luciano Floridi [1, p. 17] pointed out, it is pointless even to ask ourselves whether we are online (connected) or offline (disconnected), since the pervasiveness achieved by devices allows us to live onlife: the digital is part of our daily experience, as it can no longer be distinguished or separated from the reality we perceive and interact with.

Within this onlife, Artificial Intelligence (or Artificial Intelligence, frequently abbreviated to AI) is assuming a predominant role, underpinning so many technological platforms that enable the most diverse activities. Consider, for instance, Amazon.com, a very famous e-commerce website that "studies" our habits and our online purchases in order to propose the "Recommended for you" section, containing products of potential interest to us. Meanwhile, Facebook is one of the most established social networks used all over the world: its feed (i. e. the bulletin noticeboard featuring posts and news) is constantly modified on the basis of our interactions, i.e. our likes comments and views. In addition, the major search engine, Google, enables us to find information of interest in the boundless world of the, customises the marketing messages and advertisements that are displayed during navigation on the basis of our tastes tastes, experiences, and knowledge extrapolated in the course of using all the tools of the Google family.

The “intelligent” behaviour displayed by the above-mentioned platforms are obtained thanks to artificial intelligence algorithms. But what is meant by AI and how can it be defined in more rigorous terms? John McCharthy, one of the founding fathers of AI proposed this definition: “[Artificial Intelligence] is the science and engineering of creating intelligent machines, in particular intelligent computer programmes. AI refers to activities such as employing computers to understand human intelligence, but AI should not be confined to methods that are biologically observable” [2].

Therefore, one of the main purposes of AI is to understand human intelligence, i.e. that ability to reason, plan, solve problems learn quickly and learn from experience [3, p. 13—23].

To realise this understanding and to enable AI to interact with human intelligence an attempt was made to design solutions that would allow algorithms to learn from large data sets (to be considered as ‘experience’ in computer science). Dehaene suggests that “Learning (and thus learning), means capturing with thought: to retain a portion of reality, a model of the structure of the world. <...> Through learning, the raw data that strike upon our senses become abstract ideas, sophisticated and generalized enough to be exploited in new situations. situations” [4].

What Dehaene proposed for people represents the dream for AI projects: within this field it is common to find references to machine learning. This expression denotes the set of statistical techniques that improve automatically through experience.

Imagine, for instance, that you want to train a computer to recognize independently the presence of a cat within a photo. One could achieve this by exploiting machine learning techniques with supervised approach, i. e. selecting a large number of photos containing cats (which are associated with the label “cat”). At the same time a large quantity of images in which no cats are present and (associated with the label “no cat”) shown. By feeding these two classes to a machine learning algorithm, an optimised model can be arrived which will have automatically recognised the patterns (i.e. recurrent patterns) present in the images of both classes, thereby being able to make predictions in the event that a new photo (not used in the training phase) is provided as input to the model. It is worth emphasizing a distinction between machine learning techniques implemented by electronic computers and

the learning process that occurs when a child learns to recognise a cat: AI algorithms need several hundred thousand photos in order to be properly trained, whereas after just a few encounters with a cat, the child will be able to recognise the animal in new life situations.

In these few lines we have summarised the three fundamental steps in AI: preparation of the data, choice and training of the machine learning model, prediction and verification of the correctness of the algorithm.

The spread of AI and machine learning have proceeded extremely fast, and have contaminated so many areas of human life: education is no exception.

Main part. The international scientific literature highlights AI in education as a particularly emerging field within educational technology [5]. For over thirty years, in fact, AI in education (AIEd-Artificial Intelligence in Education) has been the subject of a wide debate that is increasingly characterised by an extended interdisciplinarity: education, psychology, neuroscience, linguistics, sociology and anthropology. The specific objective is to promote the development of adaptive learning environments and other flexible, inclusive AIEd tools. AIEd tools that are flexible, inclusive, personalised, engaging and effective, exploring potential pedagogical opportunities [6]. In particular, AI, integrated into learning activities for continuous analysis of student outcomes, it can provide just-in-time feedback and assessments, as well as predict the likelihood of a student failing an assignment or dropping out a course [7]. In this regard, one must first distinguish four main areas of AI: Machine Learning (ML); Deep Learning (DL); Natural Language Processing (NLP); and Computer Vision (CV).

Within the framework of ML, DL is a field of research that is based on the creation of models of learning on multiple levels, with particular reference to the learning of verbal and visual data that are not provided by humans, but are learnt through the use of algorithms of statistical calculation with the aim of understanding how the human brain works.

Learning takes the form of a pyramid: the highest concepts are learnt from the lowest levels. An example is the facial recognition system in which the data made up of pixels allow the edges of a face, individual physiognomic features and individual physiognomic features and finally the image of the face [8]. Indeed, the DL “allows computational models composed of multiple layers over processing to

learn representations of data with multiple levels of abstraction" [9, p. 436—444]. The DL has made important advances in a number of complex tasks, including speech and visual and so-called full knowledge games such as chess and StarCraft [10]. The research areas in which it has the greatest application lie in Natural Language Processing (NLP) and Computer Vision (CV).

Referring to this specific field of research, in the educational field are the Intelligent Tutoring Systems (ITS), used to simulate one-to-one personal tutoring. The ITS contains representations of the learner's knowledge, a model of domain model that describes the knowledge to be learned and a pedagogical model that guides the student towards the learning objectives. Thus, the ITS can make decisions on the learning path of an individual learner and the content to be select, provide cognitive support and engage the student in dialogue. Furthermore, the ITS, can also contribute to collaborative learning by supporting the formation of adaptive groups based on learner models, facilitating online interaction.

The field of NLP is based on the development of algorithms that empower computers to analyse and understand the contents of natural language, whether written or spoken. Hence, NLP focuses on the understanding of language [11] in relation to its meaning (semantic analysis), the grammar and structuring of sentences and words (syntactic analysis), the extraction of opinions from texts (textual analysis) and the context of use.

New approaches to NLP range from statistical analyses that collect and process written texts written texts by tracing lexical patterns, to the analysis of reflective writing (sentiment analysis) to identify tone of voice and mood, to speech recognition or conversational interfaces such as chatbots or voice assistants that simulate human behaviour through communicative interaction with the user. Personal voice assistants aim to relate to the user in a colloquial manner by simulating a conversation on digital channels (such as websites or mobile applications) through a wide range of interfaces (voice, chat, IoT, etc.). Examples are Apple's Siri Apple's Siri or Microsoft's Cortana, which make it possible to analyse the habits and user behavior [12].

In educational contexts, NLP methods have been explored to facilitate students' access to content of online lessons by students, to create courses through the automated generation of e-learning content,

to extract information and assess the quality of sources with an improved comprehension of web resource content web, to facilitate the exploratory process of investigating similarities and differences between texts, to interact in a personalised way through chatbots with positive effects on students in terms of communication, negotiation, interest, motivation and learning [13, p. 179—192].

CV is a field of research aimed at understanding how computers can reproduce processes and functions of the human visual apparatus. Specifically, computers, through DL models, are trained to interpret and understand the visual world. Among the main CV applications:

– remote sensing to detect and classify conditions;

– optical character recognition that converts any type of text into an image;

– the restoration of works of art by analysing surfaces both geometrically and in terms of materials;

– visual serving based on the control of robot movement through the information released by visual sensors;

– the movement tracking and diagnostic analysis in telemedicine;

– the indexing of image databases;

– object or person recognition.

Specifically, in recognition, images are processed through an algorithm that analyses them to recognise according to certain patterns. In this sense, robotics is poses as a field closely related to computer vision (robot vision). They are particularly significant in the educational field on computer vision techniques to be incorporated into social robots. Some robots can in fact interact with humans via audio and visual tracking technologies. An example of this is the NAO Robot, which has a high sensory capacity and cameras capable of capturing the images to be processed.

Conclusion. It is important to emphasise two aspects that should always be kept in mind to plan the introduction of Artificial Intelligence in the educational process:

– the centrality of the student in the learning process, to be realized through project-based learning approaches and the construction of AI-enhanced applications. Nevertheless, this centrality has to be taken into account in the design of AI tools that will improve the educational processes, enabling the learner to visualise and reflect on the analyses performed by these systems;

– the importance of the training of teachers, who should not be replaced by technology and algorithms, but who will be able to use powerful tools for analysing student activities, and will be able to save time and energy precisely thanks to these devices enhanced by AI so that they can devote themselves to the relationship with their pupils, a fundamental starting point for effective education and deep learning.

In a nutshell, AI can bring benefits to the educational world only if it succeeds in implementing a necessary collaboration between professionals from the worlds of Technology, Psychology, Pedagogy, Philosophy and Education: a necessary starting point for the design of truly effective and centered AI solutions and focused on the needs of students and teachers. This type of interdisciplinary approach will certainly require significant investment and a lot of work, but given the first promising results it would be inappropriate to forego the advantages that AI could bring in the world of education.

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PLATFORMS FOR ORGANIZING DISTANCE LEARNING

The concept of distance learning, its advantages over contact learning are considered. Various educational platforms are used to organize distance learning. In this article, we will look at the main platforms for distance learning, such as Moodle, Webinar.ru, Blackboard, Skype and Claroline LMS.

Key words: distance learning; platforms for distance learning; components of distance learning.