

APPLYING ARTIFICIAL INTELLIGENCE TO E-LEARNING: AN OVERVIEW

APPLICARE L'INTELLIGENZA ARTIFICIALE ALL'E-LEARNING: UNA

PANORAMICA

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Abstract

Artificial intelligence has become an integral part of everyday life, changing and conditioning the use of many digital applications. This transformation has affected many sectors, including education. The main objective of this short article is to identify the benefits of applying artificial intelligence in the educational context. This application can cover several points such as the suggestion of personalized educational content, the identification of innovative and specific teaching methods, the best association between teacher-student based on their profiling. The analysis of these points and the application of these technologies has as its purpose the improvement of the e-learning and MOOC sector, able to offer educational paths more and more specific and suitable to the various needs required by students.

L'intelligenza artificiale è diventata parte integrante della vita quotidiana, cambiando e condizionando l'uso di molte applicazioni digitali. Questa trasformazione ha interessato molti settori, tra cui l'istruzione. L'obiettivo principale di questo breve articolo è quello di identificare i vantaggi dell'applicazione dell'intelligenza artificiale nel contesto educativo. Questa applicazione può coprire diversi punti come il suggerimento di contenuti educativi personalizzati, l'identificazione di metodi di insegnamento innovativi e specifici, la migliore associazione tra insegnante e studente in base al loro profilo. L'analisi di questi punti e l'applicazione di queste tecnologie ha come scopo il miglioramento del settore e-learning e MOOC, in grado di offrire percorsi educativi sempre più specifici e adatti alle varie esigenze richieste dagli studenti.

Key-words

Natural Language Processing, MOOC, Artificial Intelligence, e-learning
Elaborazione del linguaggio naturale, MOOC, Intelligenza Artificiale, e-learning

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1. Introduction

Over the past decade, we have seen a general shift in information technology. Artificial intelligence and big data have become essential elements of the IT marketplace. Among the various application contexts, machine learning has also found an outlet in the e-learning context. These changes have affected not only the educational curriculum. In recent years more and more people have chosen to use learning platforms such as Google Classroom, Edmodo, Power School, Moodle. There are a large number of Massive Open Online Courses (MOOCs) for online study such as coursera.com. The increasing amount of active users of MOOCs courses shows that electronic and distance learning methodologies are appreciated by society. According to "artificial intelligence is that activity dedicated to making machines intelligent and simulating human behavior. In this context, AI can try to understand the difficulties of students and figure out how to help them and define an alternative path and successful educational experience as proposed in (Toti, 2021). As reported in (D, 2013), in a survey of how AI's influence on people and society, he argues that "applications of AI are now widely used by educators and students including tools and technologies such as instructional robots, intelligent tutoring systems, and adaptive learning systems. The goal of this paper is to determine, in general, how AI can contribute to the improvement of online education.

1. Main Aspects

The model studied for a future realization of an architecture is based on artificial intelligence approaches useful to improve e-learning processes and based on 4 fundamental aspects that are: Content, Teaching methods, Assessment and Communication.

Our model is based on two levels based on the first two aspects that are the most important ones, and will be the ones discussed in this article.

Teaching methods are different and depend both on the content that needs to be taught and transmitted to the students, and on the subject matter that is being covered. This part is very interesting and important as teaching methods are currently influenced by new technologies.

Assessment is a very complex activity and refers to a wide variety of methodologies and tools that teachers use to assess and measure the level of preparation and learning of students. With the development of MOOCs it is essential to use artificial intelligence technologies to support the entire learning process and to plan the best activities to propose to each student. The article provides an analysis of these approaches and shows the effectiveness of using artificial intelligence and natural language processing in learning systems. The effectiveness of such systems is also described in (K., 2011) and (Steenbergen-Hu S., 2014).

Many companies such as ProfessionAI, Coursera and Udemy, which offer online courses, are beginning to adopt AI methods capable of supporting students for studying and learning.

2. Teaching Methods Layer

One of the challenges in teaching students is that everyone has a different pace of learning and understanding instruction, thus one could have too heterogeneous classes of students formed by students with difficulties and students who bark because they are bored. Artificial intelligence with methods that allow personalized learning, allows to solve this problem, as shown in (C., 2016), (al, 2016). This approach helps to avoid students' failures during exams and support them during the study period. It can be pointed out that personalized learning methods can also be combined with gamification techniques in order to achieve an even higher quality of education.

In particular, gamification elements such as leaderboards and points can be useful for recording student progress and solving the problem of balancing the speed at which students understand new academic material. Build vectors to represents students by using embedding approaches and classify contents and document to study as showed by (Lomasto) can be useful. The Natural Language Processing approach can be useful for building models that can summarize documents in order to obtain short, summarized content for review activities (Miller).

AI-enable robotics is an emerging and fast-developing technology, even though it is still relatively new scientific area. Educational domain is one of the fields, which applied robotsfor working process (J., 2016), (Stone, 2016).

It is also true that a highly motivated student does not need a personalized learning system, since this student discovers on his own all the important information that is needed for his study. The popularity of the term personalized learning nowadays comes not from the demands of pupils, but from companies that want to sell software.

3. Assessment Layer

Artificial intelligence can be used as a tutor that answers routing questions regarding assignments or curriculum. At the same time, it helps identify learning gaps in student performance. Basically, the instructor (teacher) evaluates a sample of student responses, theAI creates a computer model that incorporates the rules it inferred about the instructor's evaluation decisions. After that, this model can be used to assess other students' tasks.

One of the examples is technology-enhanced learning activities using tablets in classrooms, as was developed in the METAH lab in Grenoble (Wang, 2018). This system allows students to monitor every step they take in a class. Students use tablets while solving tasks and making assignments and the teacher is able to monitor and evaluate them.

One well-known technique, which is typically used for early identification of student failures, is Educational Data Mining (al., 2017). The authors of the article demonstrated that EDM techniques are "effective enough to identify student academic failures early, and then are useful for providing educators or teachers with relevant information to aid in decision-making." In addition to classic data mining methods, EDM also researches psychological metrics to gain a better understanding of student behavior. The strengths of AI assessment are efficiency, consistency in applying the same criteria across students, and immediate and detailed feedback on performance.

4. Conclusions

The article describes the possible impact that artificial intelligence can have in the field of education and elearning. In particular it allows offers an idea on how it is possible to identify the difficulties of the students and to understand how to help them. The implementation of AI technology is giving many opportunities for the development of mass open online courses. The assessment of a large number of tasks, the detection of learning and teaching gaps would no longer be a problem with the implementation of intelligent systems. Furthermore, the measurement of learning progress is becoming more and more effective. Despite this, AI-based evaluation systems cannot be absolutely true in every situation and require the help of human support. In addition, intelligent tutoring systems create a digital profile of a student who can be assigned a much more relevant personal tutor.

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