INOVATIVNI PRISTUP POUČAVANJU NA DALJINU UPOTREBOM UMJETNE INTELIGENCIJE

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Sažetak
Umjetna inteligencija (AI) danas omogućava stvaranje konteksta komunikacije između čovjeka i računalnih sustava i to kako kod verbalne, tako i kod neverbalne komunikacije, upotrebom računalnog vida koji analizira umjetna inteligencija i upotrebom kognitivnih servisa markira sentiment (emociju/raspoloženje), spol i dob osobe, analizira pokrete i time omogućava veću mogućnost personalizacije edukacije.

Ovaj rad otvara i mnoga druga, etička i čisto pragmatična pitanja, pitanje hoće li umjetna inteligencija zamijeniti ljude baš na svim poslovima ili samo na onima koji su teški, repetitivni i zahtjevni, poput ispravljanja testova (koji nemaju ponuđene a-b-c odgovore), naprednih provjera znanja koje se prilagođavaju ispitaniku, pomažu kod automatske provjere izvornosti (plagiranja) itd. Možda je ipak umjetna inteligencija danas tako potreban „suradnik u nastavi“ koji će pomoći edukatorima u modernizaciji pristupa učenju i poučavanju? Ili će takvi poslovi vrlo brzo dosaditi i umjetnoj inteligenciji?

Ključne riječi: AI, umjetna inteligencija, poučavanje, edukacija, daljina, komunikacija,

INNOVATIVE APPROACH TO DISTANCE LEARNING BY USAGE OF ARTIFICIAL INTELLIGENCE

Abstract
Today artificial intelligence (AI) enables the creation of a context of communication between man and computer systems, both in verbal and non-verbal communication, by usage of computer vision that analyzes artificial intelligence and uses cognitive services to mark/recognize feelings (emotion/mood), gender and age group and movements of a person and thus enables greater personalization of education.

This paper opens up many other, ethical and pragmatic questions, whether artificial intelligence will replace people/humans in all their jobs or only in those who are heavy, repetitive and demanding, such as correction of tests (which do not offer a-b-c responses) or at advanced knowledge testings that are adapted to the examinee or will it help with automatic authentication (plagiarism), etc. Perhaps today, artificial intelligence is so necessary as an "associate in teaching" that will help educators modernize learning and teaching? Or, artificial intelligence, will get bored with such jobs very quickly?

Keywords: AI, artificial intelligence, teaching, education, distance, communication
1. Introduction
Through history, needs for education have been changing. In order to meet the need for quality learning, regardless of the location of the learner or the time of learning, the concept of distance learning has been created. In the past, it was called "correspondence learning", and the term "distance learning" was adopted with the advancement of modern technology. Most people, in reference to learning, refers to formal education, but today's way of life and work demands lifelong learning, which are often carried out on an informal, unconventional ways. Especially young people like to use popular lectures published on YouTube and/or similar services. The fact that this teaching method is used by institutions such as The Stanford University, The Harvard University, The Massachusetts Institute of Technology (MIT) [1] is very clear proof that this is a widely accepted trend. Taking this into account, one has to ask the question: is the lecture (whether live or recorded) good enough if we want to teach remotely? What if we want to run mentored lectures, with dozens, hundreds, or even thousands of people who can attend massive open online course (MOOC) [2] and [3] at the same time? How to personalize access to each remote learning participant, especially in real time? Distance (or on-line) learning engages learners in the new learning styles that, usually lack physical contact or even communication with other learners. One of the challenges in distance learning is lack of personal support and human intervention [4]. On the other hand, one of the success factors is flexibility to make mistakes, and instant feedback [5]. In this paper we are discussing how we can make distance learning better using artificial intelligence (AI) and computer vision.

2. What is artificial intelligence (AI)?
Perhaps it is best to start with the definition of the Croatian Encyclopedia [6], which states: "Artificial Intelligence (AI), is a part of computer science that develops the ability of computers to perform the tasks that need some form of intelligence, that is able to deal with new opportunities, to learn new concepts, to make conclusions, to understand natural language, to recognize scenes etc.". The same source states that this term denotes "... the characteristics of any inanimate system that shows intelligence (intelligent system) ...", usually refers to a computer system. The current state on the field of artificial intelligence is such that its applications are strictly specialized in an area or are used in a wide variety of different application fields.

3. What is the situation with artificial intelligence today?
Wherever we look, everything tells us that artificial intelligence is everywhere around us, embedded in, more or less, "smart devices" that surround us. Some, until now, exclusively human characteristics, such as intuition, become characteristics that artificial intelligence has too. Until recently, technology has affected heavy, repetitive and physically demanding occupations (Blue Color Jobs), while artificial intelligence today enters into a range of professions that are requiring great knowledge, skills, and even creativity (White Color Jobs). But by the time that happens, artificial intelligence can become a partner of human in enhancing the quality and efficiency of one of the important human activities - education.

4. What is the role of artificial intelligence in education?
Before we start the discussion of the role of artificial intelligence in education, it is necessary to analyze the educational process and to find those elements that could be improved or accelerated or eliminated. Like in every business, as well as in education, there are boring
activities that are not the central part of teaching but are important to education such as: correcting homework or exams, recording attendance records, creating lessons’ notes, creating student reports or preparing exam questions. Technology and computers have helped to make easier part of the fatigue business, such as the most common preparation of teaching materials in PowerPoint or similar tools. But technology has also brought new challenges, so for example, students can find, online, already completed, written book essays or seminar paper. They copy them or rewrite them and hand them over as their own. In the ocean of information on internet, to educator/teacher is difficult to determine the difference between original work or plagiarism every time, but there is artificial intelligence that can identify not only identical copies, but also distinguish properly listed quotes and sources of slightly altered copies of original works. Part of the artificial intelligence covers the area of so-called cognitive services that, for example, are able to write a textual note of a lecture held on the basis of a real-time lecture video analysis. Software like Microsoft Video Indexer [7] can describe what was happening in that video and write down notes about that lesson specifically for this lecture. Artificial intelligence can easily count the students, prepare an exam based on a set of questions prepared by the educator as well as assist in their evaluation, whether it is a-b-c based questions or essays.

5. How to use artificial intelligence in education to achieve more?
To get rid of boring and repetitive jobs is one thing but to achieve a higher level in education core business – teaching and mentoring – is something completely different. Each educator/teacher wants on the best possible way to transfer knowledge, skills and experience to their students, but it is neither easy nor simple job, particularly at the present time. In order for each student to reach their maximum, a personalized access to learning is required. In our opinion, the most important role of artificial intelligence is to help the educator/teacher to gain information on how the student thinks and what form of learning best suits him/her. Computers have the ability to work parallel with large amount of information, but only artificial intelligence can understand what this information represents in the context of education or teaching.

6. How can artificial intelligence improve the way we teach and learn?
As stated in the introduction, one of the challenges in distance learning is lack of personal support and human intervention [4]. It’s almost impossible for educator/teacher to contact with each and every student when dealing with large number of people. Also, it’s hard to schedule human-to-human communication when students learn in different time or even time zones. This is where artificial intelligence can help to improve distance learning experience – by serving as a “bot-mentor”, that communicate with the human student, not just verbally but also using camera to recognize non-verbal communication by student. While there is a number of bot frameworks that supports verbal communication, non-verbal communication is less researched. It is often forgotten that non-verbal communication makes, depending on the source, 65-85% of the total communication. Knapp and Hall [8] claim that non-verbal communication makes up 65% of interaction between people, while Grant and Hennings [9] claim that 82% of teachers’ communication is non-verbal communication. It is especially important for very young children or people who learn foreign language and is often used when a person cannot find the right word or would like to point out a fact. On the other hand, one of the authorities in the field of verbal and non-verbal communication professor emeritus psychology professor
at The University of California, Los Angeles (UCLA) Albert Mehrabian, in year 1967, based on scientific studies, among others published in the book [10], set the rule 7-38-55, which means that for communication the importance of the spoken word is 7%, the way in which it is spoken (loud, silent, sharp, etc.) is 38%, and the expression of face is 55%. Although it was a simple experiment, which may not be fully applicable in everyday communication, it still provides a good basis for all subsequent analysis and research. Artificial intelligence can help in continuous monitoring and analysis of that particular part of the non-verbal communication during the educational process, regardless of whether it is a matter of educator/teacher and students are in the same place or it is distance learning. The result of this analysis can help the educator/teacher to understand better how to address their students or allow virtual teachers to be created through new computer user interfaces that use non-verbal communication, and gender and age group information to create a context of communication that is verbal, voice or text.

Another use of artificial intelligence, specifically application of deep learning area of computer vision called Generative Adversarial Networks (GAN) [11] is to generate video of artificial human face that is so real and that helps in non-verbal communication with human student. It’s very important for humans to see the face of the “person” with whom talks. Newly generated face can be the one of educator/teacher or completely new, non-exiting, face [12]. On the other hand, one of the success factors is flexibility to make mistakes, and instant feedback [5]. Future to the fact that artificial intelligence can, thanks to its large processor power, handle a large amount of information in a short period of time and to quickly make more or less complex decisions, easily adapt to new situations, it is no problem for artificial intelligence to imitate a man-mentor that is focused on only one student and in such way to help to personalize learning and adapt to each person's personal needs. Artificial intelligence also allows the creation of images of so-called feedback link that gives the educator/teacher information on how many of the student has understood some content, or whether the lecture achieved his/her goal, regardless of whether or not he/her sees the teacher.

7. Is there a danger of artificial intelligence being abused?

As time goes by the difference between artificial and human intelligence is diminishing, with the advantage that artificial intelligence has with almost instantaneous availability of information and the possibility of much faster communication, there is fear, on the one hand from abuse, on the other hand that it takes on primacy in relation to people. The fears are very strong especially if we take into account different, in theory possible, scenarios where artificial intelligence develops its own consciousness. Although there is still plenty of room for progress of artificial intelligence, the speed with which enters into our everyday business and personal life demands of mankind to redefine social relations, adjust ethical, then the legal framework for applying of artificial intelligence. One of the most famous examples of ethical dilemmas is the decision that artificial intelligence should bring in autonomous driving systems. For example, when artificial intelligence has to decide for the least bad scenario and when there are no positive outcomes (casualties of one or more persons, a child or an adult, in the vehicle or outside it, etc.). One of the methods is that in such situations the decision has to be made by humans again. If we look at artificial intelligence as just another tool that can help people (teachers) then we should always remember that each tool can be used both for good and for evil. So, humans have to set rules that will protect humanity from abuse of artificial intelligence and use it for its progress, not for fall.
8. Conclusion
Artificial intelligence is already here among us. On the humans, in this case educators/teachers, is that they use it in the best possible way to improve education, especially the processes of teaching and learning. It can help to increase the productivity of educators/teachers by helping them with repetitive tasks, such as preparation of interesting and always different questions for exams, with fast and accurate grading of these exams, writing notes from the lessons and recording attendance records. The more complex application of artificial intelligence is certainly the creation of personalized teaching and learning for each student, through the understanding of the context in which these processes occur, on the basis of gender and age group recognition, as well as continuous monitoring of the verbal and non-verbal communication of students’ feedback. All these elements of artificial intelligence can take into account and dynamically adapt the contents and the way of communication with the student, expanding or deepening topics that the student has not understood or shows an additional interest. Although it is too early to talk about the emotions of artificial intelligence, the latest research and testing in this area shows that so-called deep learning enables artificial intelligence to develop intuition. The usage of artificial intelligence in education is at the very beginning, so therefore is necessary to define new teaching and learning frameworks, to carry out a series of practical research that will make possible to measure the contribution of artificial intelligence to education and show us which is the best way to apply it. We cannot ignore the fact that artificial intelligence enters into all human activities. Therefore, it is necessary to look at what is the best way to get it involved in the education process, whether we are teaching or learning. We should start with experimentation, without fear, because human’s intellect is still, in many areas, superior to computers.

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Biography:

Tomislav Bronzin mag.ing.el., direktor i osnivač tvrtke CITUS, čija je glavna djelatnost proizvodnja programskih rješenja i savjetovanje za razvoj aplikacija na Microsoft platformi. Autor je pet patentova područja ICT-a, te zajedno sa svojim timom osvojio više od 60 medalja za inovacije u ICT-u (SAD, Velika Britanija, Kanada, Koreja, Rusija, Tajvan, Hrvatska, Malezija, Rumunjska, Poljska). Bio je uključen u projektiranje i implementaciju prvih mobilnih i te razvoj cloud rješenja baziranih na Microsoftovoj platformi. Ima više od 20 godina iskustva u struci, 15 godina za redom nositelj je počasne titule Microsoft Most Valuable Professional, a 10 godina je bio Microsoft Regional Director. Redovni je predavač na mnogim međunarodnim konferencijama. Predaje na nekoliko fakulteta i mentor je studentskim timovima na različitim projektima. Jedan je od osnivača Microsoft Community-a u Hrvatskoj, a pomogao je osnivanju istih u Bosni i Hercegovini, Srbiji, Makedoniji, Armeniji i Moldaviji. Član je izvršnog odbora za međunarodnu suradnju i SAD-a, kako u Hrvatskoj, tako i u čitavom svijetu.

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Ima dugogodišnje iskustvo u međunarodnim tvrtkama u segmentu marketinga, komunikacija, PR-a, brand mangament-a i project management-a. Kroz svoj rad uvodila je nove proizvode, usluge i tehnologije na tržišta te vodila multidisciplinarne timove. Zahvaljujući dugogodišnjem radu u međunarodnim i tehnološki naprednim kompanijama te FMCG industriji stekla je veliko iskustvo i mnoge vještine prilikom rada na mnogim projektima te uvid u trendove i učinke implementacija novih tehnologija. Bila je član nacionalnog tima u procesu standardizacije u sklopu EU (prije ulaska RH u EU). Svoje znanje i iskustvo prenosi kao konzultantica i mentorica. Predmet interesa su joj nove tehnologije, umjetna inteligencija, komunikacija, zaštita privatnosti, upravljanje ljudskim kapitalom, razvoj novih proizvoda, usluga i brendova.

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