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A Study of Role and Implementation of Artificial Intelligence in Higher Education

Dr. Mrs. Sampada Gulavani
Associate Professor,
Bharati Vidyapeeth (Deemed Univeristy), Pune
Institute of Management,
Kolhapur (Maharashtra, India)
E-mail: sg4906@gmail.com

Dr. Mukund Kulkarni
Assistant Professor,
Bharati Vidyapeeth (Deemed Univeristy), Pune
Institute of Management,
Kolhapur (Maharashtra, India)
E-mail: mymukund@gmail.com

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ABSTRACT:

In higher education, the technology is used to enhance human thinking and to augment the educational process to a set of procedures for content delivery, control and assessment. The advances in Artificial Intelligence (AI) and technology have provided new methods of teaching and learning in higher education. The significant advances in AI along with machine learning and deep learning open new possibilities and challenges for higher education. In this decade everywhere we are observing recent technological advancements and the increasing speed of adopting new technologies in higher education. AI presents new openings and direction for education to the students where life-long learning is possible which is the purpose of higher education. By considering this, an attempt is made by the author to explore the phenomena of the use of AI in teaching and learning in higher education.

Keywords: *AI, Higher education, deep learning, Machine learning, Teaching,*

1. Introduction:

John McCarthy in 1955 defined the term Artificial Intelligence (AI), as a computer with the capability to perform a variety of human cognitive tasks, such as communicating, reasoning, learning and problem-solving. AI acts like a computing system and also assist in human-like processes such as learning, adapting, synthesizing and self-correction AI is used to describe a different technologies and algorithms with machine learning, natural language processing , data mining, and neural networks. In the coming years, AI is applied in different sectors like business, healthcare,

transportation, retail, finance, and higher education. AI brings a concept of Virtual Reality and opens up the possibility for higher education services both inside and outside the classroom. .The companies in higher education like EdTech have developed 'Individual Adaptive Learning System' that allows personalized learning. Some of the common definitions of AI in higher education given by different authors are:

2. AI in Education:

In the last ten years, AI-based education has emerged, since the current environment of fixed classrooms, lectures, and static printed textbooks is not capable of serving a digital society and not useful for the students for their study purpose. There is a need to obtain deeper knowledge about human cognition, which requires more effective constructivist and active instructional strategies. AI techniques assist for developing representations and reasoning about these new cognitive insights. AI provides techniques to better understand the mechanisms underlying thought, knowledge, and intelligent behaviour. It also provides a richer appreciation of how people learn.

AI in Education can be categorized in three parts like:

i) Learner-oriented AI: It enables students to study a subject domain and assist to select an adaptive or personalized learning management system.

ii) Instructor-oriented AI: These systems help teachers to monitor students' learning progress. It is also used to automate tasks such as administrative procedures, assessments, plagiarism detection and provision of feedback.

iii) Institutional system-oriented AI: In this method, AI tools can provide useful insights to administrators and decision makers. It assist for enrolment and attrition patterns across colleges. AI helps to prepare and provide analysis of every students in a class and. It also give clear idea about student's understanding on each and every topic. If student is finding difficulty or lagging in some subjects, then AI analysis provides this report to teacher or parents, so that appropriate action can be taken.

Commonly used AI applications in higher learning are discussed below:

i) Use of AI to increase Grading of student: AI assists the teachers to automate grading for all kinds of multiple choice and fill-in-the-blank testing.

ii) Additional support from AI Tutors: AI helps to clear the fundamental subjects of the students mathematics, science , and languages. But to develop high-order thinking and creativity this system is not useful.

iii) Helpful feedback by AI-driven programs: AI provide feedback to the students and teachers about success of the course. It also useful and provide support to the teachers to find to improve their teaching in difficult subjects.

iv) AI could change the role of teachers: AI can help students to improve learning and may even be a substitute for real-world tutoring. In this case, teachers acts as facilitator and assist students who are struggling, and provide human interaction and hands-on experiences. In different ways, technology is driving some of these changes in the classroom in online education or embrace the flipped classroom model.

v) AI can make trial-and-error learning less intimidating: AI offer students a way to experiment and learn in a relatively judgment-free environment. It is applicable especially when AI tutors can offer solutions for improvement.

vi) AI may change the mode of learning: Using AI systems, software, and support, students can learn from anywhere in the world at any time where mode of learning is changed.

3. Examples of AI in Higher Education:

i) IBM's Supercomputer Watson: Watson is used for administrative workforce profile in higher education in Deakin University in Australia. It is changing the structure of working environment of the university regarding the time and the structure of its workforce. It is suitable to fulfil the repetitive and relatively predictable tasks.

ii) Eliza: It is natural language programme built by Joseph Weizenbaum (1966) in MIT. It provides machine and human interface by various programmes.

iii) MYCIN: It is used in medical science. It is an expert system that helps physicians with diagnosis and therapies of bacteria infected patients. It provides tutoring approaches with domain expertise so that knowledge becomes accessible to learners.

v) AI Chatbot: Chatbot is used for administrative work and is available for 24 hours and 7 weeks. It assist to answer students' questions, measure attendance and grade profile. It also helps to measure performance of the student.

vi) Google Duplex: It is an outgoing calls system in a realistic human voice. AI could schedule a live counsellor to call that student and provide notes. It allow a small number of counsellors to respond to more students in less time.

vii) Shadow Health: This program is used to simulate patient cases for nursing students. The aim is to schedule time with live actors.

viii) E-Coach: It focuses on formative feedback for a variety of subjects in the STEM fields. E-Coach tracks students in large classes as they progress through lessons, guides them away from common mistakes and identifies potential areas of interest.

ix) Mika: It provides personalized feedback for students as they work through mathematics problems. It also categorizes the needs of students into specific skill sets. This helps tutors and faculty to diagnose issues and provide a solution for the student.

x) Teacherbot: Teacherbots is machine-based software or hardware and play the role of teacher assistant. It helps to facilitate, monitor, assesses and manage student who are learning in online mode. It is used for personalized education, and able to provide supervision, and guidance for students. It organize information and provide fast answers to a wide set of predictable questions.

4. Future State of AI in Higher Education:

In COVID-19 situation, higher education experienced changing approaches in teaching and learning. In coming years, students will face a new environment that is based on uncertainty and challenges. To face this, a student will require different skills like creativity and flexibility to adapt to uncertain contexts. In such situation, AI provides information as per the requirement of learner's needs and provide feedback to them. Different sets of tasks with teaching practice in higher education, will be replaced by AI software based on complex algorithms designed by programmers . To take full advantage of AI in higher education, it is necessary to consider a variety of regulatory, societal and organizational concerns. There is a need to change the view of institution and society towards contribution of AI in higher learning. Also it requires to resolve practical and ethical challenges of AI and needs requisite effort to address them. AI in higher education is still in preliminary stages of adoption. AI will be a game changer in higher education and assist students to learn and extend the accumulated knowledge in near future. There is a need that higher education should focus on entirely new paradigm and creativity. Also there is a need to focus research regarding the different roles of teachers on new learning pathways in higher education by considering new set of graduate attributes. It requires to give focus on imagination, creativity, and innovation. Also it requires to consider the set of abilities and skills that cannot be replicated by machines.

5. Conclusion:

As compared to other sectors, role of AI in education sector is not progressed upto the mark. And is lagging behind. Also for the implementation of AI in higher education requires large amount of finance. Computer professional should implement theory of learning while developing AI models. AI in teaching and learning will dramatically change the structure of higher education across the world. Recent advancements in AI like machine learning and deep learning are opening new possibilities to rethink the role of the teacher. The future of higher education is based on the developments on new technologies and computing capacities of the new intelligent machines. However, it is important to consider the current limits of technology and always keep in mind that AI is not ready to replace teachers, but is presenting the real possibility to augment them. Furthermore, higher education institutions requires to consider different possibilities and challenges by use of AI in teaching and learning.

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