



Artificial Intelligence and machine Learning in education

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Abstract:- Artificial intelligence (AI) becomes one of the emerging issues in higher education. This paper looked. In the age of information, expanding the amount of information taught in the classroom implementing high-quality instruction and enhancing both are the key components of teaching artificial intelligence (AI) has the potential to address some of the biggest challenges in the education today to innovate teaching and learning practice and to accelerate progress towards quality education. Artificial intelligence (AI) has the potential to significantly impact higher education in various ways. Education is a fundamental right of every human being and serves as the foundation for learning, problem solving and achieving balance in life. Technology has become an integral part of modern life, and the education sector is no exception. Artificial intelligence and machining (ML) are increasingly reshaping the education sector by making learning more personalized, efficient and data –driven.

Keywords :- Artificial Intelligence, education, Instructional Delivery, school management, AI driven tools.

Introduction:- Artificial intelligence (AI) generally expressed by the general public as the ability of machine or computer think and act as humans do, represent the efforts towards computed systems to imitate the human mind and actions. Artificial intelligence has increasingly become a pivotal element in transforming various sectors, including education in higher education, AI in education refers to the use of machine learning algorithms, natural language processing and other AI technologies to enhance learning experience, improve administrative efficiency and provide data- driven insights. Here are some Example of how AI can be applied in education. India, with its massive education systems encompassing more than 1.5 million schools and over 250 millions students, presents a unique. Case while the nation faces, significant challenges such as a high pupil – teacher ratio, disparities between urban and rural schools and varying levels of digital access, it also offers immense opportunities. India's National policy (NEP) 2020 emphasize the use of technology in education and AI has been identified as a key driver in achieving the policy's goals of inclusivity, quality and innovation.

Each wave of technological change has not replaced teachers but has instead redefined their roles, tools and methods. Today Artificial intelligence represents the next major wave of educational technology with the potential to make learning more adaptive, personalized and inclusive. These technologies enable educational systems to adopt to individual learner needs, automate routine academic tasks and provide real-time insight into student performance. Artificial intelligence and machine learning have emerged as powerful tools capable transforming teaching- learning processes.

Objectives of the study:-The study's other goals are as follows.

- To study how the artificial intelligence can be adopted with the students and education needs.
- To examine how artificial intelligence – driven courses can give students and educators helpful results.

Artificial Intelligence:- Artificial Intelligent (AI) is a multidisciplinary field of computer science that aims to create intelligent machines capable of mimicking human cognitive functions. There functions encompass, a wide range of capabilities, including the following.

1. **Learning:** The ability to acquire knowledge and skills from experience.
2. **Reasoning:** Using logic to draw inference and make decision
3. **Problem-solving:** Finding solution to complex issue.
4. **Perception:** Interpreting and understanding sensory inputs (Virtual, auditory, etc)
5. **Natural language processing (NLP):-** understanding interpreting and generating human language.

AI system support teaching assessment and student engagement through intelligent automation and analytics.

Machine learning:- Machine learning (ML),a subset of AI, focuses on the development of algorithms and statistical models that enable computer systems to improve their performance on a specific task experience.ML can be broadly classified into three categories.

1. Supervised learning- The algorithm learns from labeled data to make predictions of decision
2. Unsupervised learning- The algorithm identifies patterns in unlabeled data.
3. Reinforcement learning- The algorithm learns through, interaction with an environment, receiving feedback in the form of rewards of penalties.

ML algorithms analyze student data to identify learning pattern, predict and recommend suitable learning content

Applications of AI and ML in Education:-

1. **Personalized learning experience :-** One of the greatest advantages of AI and ML in education is personalized learning. This help slow learners receive additional support while advanced learners can progress faster without unnecessary repetition. AI driven platforms customize learning experiences according to the learner's pace strength and weaknesses, personalized content delivery helps students learn more effectively and increases motivation.

Example- khan academy

Impact:- Student learn at their own pace- less frustration more mastery.

- Efficient Assessment and feedback AI- based tools can automatically evaluate assignments, quizzes and examinations with high accuracy. AI powered grading systems provide instant feedback, reducing teacher workload and enabling more frequent assessments which helping performance.

Example- Grade scope

Impact- Reduce grading time by 50-70 % Students learn from mistakes immediately, and improve retention by 20-30 %.

2. **Enhanced student Engagement:-** AI driven Chabot's, virtual assistant and interactive educational tools use interactive content such as simulations, gamification, these tools make learning more engaging and interesting students motivation and active participation in the learning process.
3. **Increased accessibility:-** AI Powered tools such as text to speech and speech- to-text, make education more accessible for students with disabilities.
4. **Global Access to Quality education:-** AI powered plat forms help deliver high- quality educational content to remote and underserved regions this connect classrooms across continents and reduce geographical barrier and promotes equal access to education worldwide.
5. **Flexible and life long learning opportunities :-** AI enables online and blended learning models that support lifelong learning learners can access educational resources anytime from anywhere, according to their convenience. This flexibility is especially beneficial for working professionals and distance learners types of opportunities
6. **Format and vocational :-** University courses (online/blended) certifications micro-credentials, and vocational training.
 - Digital and online : Moocs (Massive open online courses)
 - Pre- recorded lectures, webinars and digital discussion boards.
 - Blended and Hybrid :- combining online learning with traditional face-to-face classroom interaction
 - Informal and self-directed- Reading, workshops, mentoring, volunteering and using public library resources.

Challenges and limitations:-

1. **Reduce Human Interaction:-** While AI offers efficiency. Challenges Include managing unemployment excessive dependence on AI systems may affect teacher- student relationships. Which are essential for holistic education.

- ❖ **Loss of emotional connection:** - you can't cry to a Chabot. You can't laugh with a grading algorithm.
 - ❖ **Diminished social skills:** - you can't teamwork from a screen.
 - ❖ **Teacher Burnout and dehumanization:** - “Reducing human interaction doesn't just affect students it affects teachers too”
 - ❖ **Cheating and academic Dishonesty:** - “if you can't tell if a student wrote it- you can't stop them from cheating”
 - ❖ **Mental Health crisis Amplified:** - Isolation + pressure= Trouble: AI doesn't notice when you are crying over home work- or when you're skipping meals”
2. **Data privacy and ethical concerns:** - The use of student data raises concerns related to privacy, security, and ethical use of information the main challenges regarding data privacy and ethics in AI and machine learning revolve around data collection, algorithmic decision-making transparency and accountability.
 3. **Lack of human touch:** - AI can't replicate teachers emotional intelligence” motivation. Or personal connection, essential for holistic development.
 4. **Transparency and Account ability:** - “Black Box” algorithms make it hard to understand decisions, creating mistrust and accountability issues.
 5. **Loss of soft skills:** - AI can or should fully replace in person learning much of what is learned in a classroom is not the course content itself but the attendant “soft skills” that student gain from the social experience of the classroom. These soft skills an essential part learning, and no matter how sophisticated our gadgets becomes, all of us still have a fundamental need to be part of meaningful classroom communities.

Conclusion:- Artificial intelligence and machine learning are seen as one of the most important Development in the recent times. In education also the researches related to use of artificial intelligence (AI) and machine learning in education is growing. Rapid changes in technology in last two decades have paved the way for paradigm shift in access to technology and awareness to use it. High speed internet mobile technologies artificial intelligence data are now part of human life at every point the future of artificial intelligence in education is bright with the potential to transform the way higher education institutions teach and learn. Artificial intelligence (AI) and machine learning (ML) technologies are poised to transform the traditional education. AI and ML offer numerous advantages in education by improving teaching efficiency and supporting intensive and flexible education systems.

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