ARTIFICIAL INTELLIGENCE IN EDUCATION

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Abstract-- **This work describes how Artificial Intelligence can be used and is being used in Educational sector. According to the 21st International Conference on Artificial Intelligence in Education held in 2020, AIED is one of the currently emerging fields in Educational technologies. The use of AI is still unclear for the educators how to make pedagogical advantage of it on a broader scale and how AI can impact on teaching and learning in higher education. The impact of AI in education and its pros and cons are presented here. It also describes a specific way to develop AI enabled platform for education and finally the after effects of AI in education.**

Keywords—**Artificial Intelligence, AIED, emerging, pedagogical**

I. INTRODUCTION

According to the 2018 Horizon report, experts anticipate that the use of AI in the education to grow by 43% in the period of 2018 – 2022. Application of AI in education has been a subject of research from the past 30 years. The report made by Research and Markets, in 2019 global AI Education market reached $1.1 billion and estimated to reach over $25.7 billion by 2030.

The precursors on the application of AI in education is found in the works of the psychologists B. F. Skinner, also known as the father of behaviorism who was a professor at Harvard University from 1948 until his retirement in 1974, and Sidney Pressey who was a professor at Ohio State University in the 1920's.

II. AI IN EDUCATION

The International Artificial Intelligence in Education society (AIED) is an interdisciplinary community at the frontiers of the fields of computer science, education and psychology. The International AIED society was launched on 1st January 1997. It gathers researchers by holding the International Journal of AI in Education (IJAIED) and AIED conference series.

In general, there are four areas of AIED in academic support services, and institutional and administrative services such as Profiling and Prediction, Assessment and Evaluation, Adaptive systems, Personalization and intelligent tutoring systems. The field of AI is both innovative and derivative.

Artificial Intelligence is an emerging technology that started modifying educational tools and institutions. Education is a field where the presence of teachers is must which is the best educational practice the advent of Artificial Intelligence changes the teacher's job who are irreplaceable in the education system. The AI uses mainly advanced analytics, deep learning and machine learning for monitoring the speed of a particular individual among the others.

As the solutions in AI continue to get to higher level it helps to identify the gaps in teaching and learning and increases the proficiency of education. AI can drive efficiency, personalization and streamline admin tasks to allow teachers the time and freedom to provide understanding and adaptability- uniquely human capabilities where machines would struggle. With the combination of machines and teachers it is possible to pull out the best results from students.

III. IMPACT OF AI IN EDUCATION

Almost AI impacts every area of our life in the future and out of all those Education sector will be impacted hugely because teaching and learning is a major part of life and the current education system has a lot of changes to be desired. The schooling in olden days are not as flexible as what the future AI in education will present. The teachers that play the most important role in education system are not scalable and

are expensive as well. In some of the countries teachers are given a heavy load of paper work and are undervalued. AI can help each individual separately by giving them separate curriculum based on their interest and skill assessments

IV. ADVANTAGES OF AI IN EDUCATION

At present young people tend to use lot of time using their smartphones or tablets. This gives them a chance to study for ten to fifteen minutes in their free time by using AI applications. AI helps us understand the mood or ease of student during the lectures by using Gesture Recognition Technology. Since AI becomes more sophisticated the machine reads the facial expressions or gestures of the student and uses them to know if the student is struggling to understand the lecture and alter the lesson so that the student can follow up easily.

The customization of the academic curriculum can be done by AI powered machines. AI tools can make global classrooms possible including people who are visually or hearing impaired. This can also help students who cannot attend classes due to illness. In the normal education system, the teacher grades the students on their homework and tests, which would consume a lot of time. Here when AI steps in it would make a quick work out of these tasks. It also helps in suggesting the ways to overcome the gaps in learning.

AI provides with several resources to people who speak different languages or have hearing or visual difficulties. Presentation Translator provides subtitles in real-time mode, which is an AI based system application. For example, with the help of google translator students can read and hear in their national language. For more interactive sessions modern technologies like VR and gamification are helpful.

There were already some setups where multiple-choice tests were graded through machines and now developments are being made in the direction where written type answers like paragraphs, statements can be graded using machines. This makes the work of a teacher easier and no time is wasted and this saved time can be used to concentrate more on individual student assessment and their development.

Admissions and enrollment processes can also be done with AI in the future and its full potential is yet to be out.AI can help students in their homework or test preparations at home. AI in the near future will be able to respond to a range of learning styles. It's all thanks to Artificial Intelligence that tutoring and studying programs are becoming more advanced. AI

applications such as AI mentors for learners are being developed for education.

AI can create groups in students who are suited for particular tasks. This is known as Adaptive Group Formation. AI application software which can instantly grade student's essays. These essays are added into a central database and the future essays can be compared using the previous essays present in the database. Artificial intelligence in education is a computer-based technology that provides personalized, adaptive and insightful teaching. The key parts of AIED system is Domain Knowledge model that provides the capability of the system to complete the tasks that makes the students to judge to contribute towards the solution. The Student Model that provides representation of the learner in terms of their developing knowledge and skills. The Model of Pedagogy is the component that represents teaching capability of the system and finally the Interface component that provides the channel through which the learner and the system communicate.

The other component of AI that is highly useful in education is Voice Assistant. It's a groundbreaking application of AI. This includes Google Assistant, Cortana from Microsoft, Apple's Siri and Alexa from Amazon. These voice assistants helps students to converse directly with the educational material that are present in the internet and the installed devices without any involvement from their teacher.

The traditional methods of learning are becoming old fashioned and are slowly being discarded by various educational institutions and some universities. They have already started offering students voice assistants instead of providing them with printed study material or websites with complicated information for their campus related information. As an example, there is the Arizona State University is offering Amazon's Alexa to their new students as an attempt to provide the students with more regular concise and precise institutional information regarding their campus needs.

Voice Assistants can be used at home and other non-educational locations to access any learning assistance. Voice Assistants main aim here is to provide answers for the common questions regarding campus needs or for a particular schedule and courses of each student which helps the institution in cutting down the printing expenses of handbook that are only used temporarily during the initial period of their joining in the institution and supports in reducing the requirement for internal support. The use of this technology is expected to be escalated in the coming years.

As artificial intelligence is becoming a rapidly increasing aspect of our daily lives, No wonder education systems are racing to catch up with the need to cultivate more talent in order to keep the AI growth engine going. However, education is not only developing as far as science, technology, engineering and mathematics (STEM) are concerned. But the education industry is being changed by AI curriculum. Smart systems are rapidly changing educational institutions from elementary to higher education, as well as adult and advanced learning, to help people learn efficiently and fulfill their learning goals.

The Intelligent Tutoring System is used to stimulate one-to-one personal tutoring. Depending on the neural networks, algorithms they can make a decision against an individual student. Students are already being exposed to the vast number of possibilities for higher education with the help of AI. AI can totally bring advanced changes in the field of education. Robots can increase the grammatical strength and create digital content. The classrooms had already started digitalized teaching.

The wave of investments and the increased interests in artificial intelligence will impact the universities in the times to come. The increase in the international student market, democratization of higher education and the increase in the financial pressure with respect to the increase in the number of students who like to undergo higher education will stand as the pillar reasons to seek out AI in higher education.

V. AI BASED SOLUTIONS IN EDUCATION

There are lot of tech driven solutions in the industry of education like Dream Box, Khan Academy, Achieve3000, etc.. There are several educational platforms based on AI technology.

- Third Space Learning
- Little Dragon
- CTI
- Brainy
- Thinker Math
- Carnegie learning

The Third Space Learning system was created with the help of scholars from London University College. It helps to recommend the ways to make the teaching techniques better, like giving a warning when the explanation of teacher is either slow or very fast. The Little Dragon creates smart applications that analyze the user's facial expressions or gestures and adapt the user interface accordingly. Little Dragon also creates educational games for kids.

Several companies such as Carnegie Learning and Content Technology started the implementation of AI for testing, learning and for taking feedback in educational system from Pre-KG to college level by developing high level instruction design and digital platforms. An online service called Cram101 by the company CTI uses artificial intelligence to study the textbooks and theoretical papers and pinpoint the highlights of the material online. It also generates practice tests and flashcards as student exercises. Another platform known as Netex Learning dedicated itself to the application new technologies in the world of learning and works on delivering digital learning in educational institutions and companies. It promotes the tutors to promote digital curriculum used audio, video and voice assistants etc. The technologists thinks that the teacher could be replaced by robots in the mere future. Augmented reality will also be a part of classroom.

VI. DEVELOPING OF AN AI ENABLED PLATFORM FOR EDUCATION

There are six main steps to develop an AI platform for education.

- Step 1. Study the existing solutions.
- Step 2. Consider the content of the application which should be both interesting as well as interactive.
- Step 3. Discuss the requirements of your project with the development team.
- Step 4. The application should be thoroughly and properly tested to avoid bugs.
- Step 5. Promote the app and get the feedback after its release.
- Step 6. Update your app regularly.

Initially we must make some analysis on the existing solutions carefully and add new feature to them so that the user gets attracted to your solution instead of the others. Study the design ideas. User's always prefer the useful content so you can choose topics like Medicine, Literature, Math and others. This useful content can also be obtained from tutors of various universities or colleges and from various sources like courses, training programs.

You need to clarify the business goals and project requirements before the project development. The development team must be an experienced team of software developers and they need to have experience in Artificial Intelligence. You can create a

simple startup version of your application or platform and after taking feedback from the users and their reviews you can update your platform on a regular basis adding extra content or extra features. Excellent user experience should be provided in order to attract more users. This can happen when there are no complaints from the users end and for this to happen we should find and fix the bugs before launching the platform. This bug fixing can be done by qualified Quality Assurance Engineers. Regular upgrade of the platform is needed based on the user's feedback.

VII. DISADVANTAGES OF AI IN EDUCATION

Despite of the huge opportunities AI offers there might also be some potential risks with it. AI is likely to become either the best or the worst thing that might happen to humanity. AI could support teaching and learning but new ethical implications and risks emerges with the development of AI applications in higher education. One such example is, due to the ongoing corona virus pandemic and the budget cuts, the administrators might think of replacing teaching with profitable automated AI solutions. If the usage of AI in education increases there might be chance that personal interactions get decreased and students get technology addicted and sometimes this may hurt the learners instead of helping them.

The faculty members, student counsellors, teaching assistants and administrative staff might get feared that the Intelligent Tutor System which is application of AI might replace them. AI system require a huge amount of data including information of students and staff which is confidential and it heads to serious privacy issues. When compared to the cost of installation, maintenance and repair AI is highly expensive. Only the heavily funded educational organizations can allow themselves to enjoy such high technology. When relied on this technology too much it can cause lack of personal connections and might hurt the users in this perspective. When something like natural disasters or accidents occur and an AI needs repairs we can never know how much amount of data is lost.

VIII. CONCLUSION

AI in education is a revolutionary change. According to a report issued by Centre for Integrative Research in Computer and Learning Sciences states that the next level uses of AI in Education is not yet invented. So the people working on AI applications should let the educators and education policy makers know about this in depth. Although there are several cons of using AI in educational sector, our future is AI so the educational system should start exposing their students to this sort of technology which started using a bit of AI. The impact of AI will be seen first in the lowest education levels and gradually increase to the higher education. The ultimate impact of AI in education will only decided by the time. The main aim of AI is to make the work of an educator easier but not to replace them.

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