**AI IN EDUCATION SECTOR**

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**AI IN EDUCATION SECTOR:**

Artificial Intelligence is growing in every sector. Education is one such sector where artificial intelligence can be applied and used for improving the quality of the sector. With the rise in lack of skilled teachers. Artificial intelligence can help to impart knowledge at less cost and reach wider audiences. It can also help innovate the normal process of teaching and bring customized plans into play. A human-centered approach to AI has been recommended by UNESCO which will help to eliminate any inequalities, or any barriers that hinders the growth of education sector and its spread.

**IMPORTANCE OF EDUCATION SECTOR:**

Education is one of the most important sector responsible for a country’s development. Improving the quality of education and the sector in general is very essential for growth of the general public.

* The sector is a sector where a person develops skills, learn new technologies and social norms, develops judgements and reasoning.
* Education helps to remove poverty and hunger. It makes people capable of getting a job and live a healthy lifestyle.
* It helps a person to improve their communication skills as well. No doubt a student learns to form a sentence at school.
* It makes people confident about themselves and their personalities. Daily interaction with fellow students results in rise in self-confidence.
* It improves critical thinking ability of a person. A person learns to think rationally and make better decisions.
* It also improves gender equality. In countries with gender inequality issues, Education plays an important role in promoting gender equality.
* It makes a person self-reliant and ready for job as person acquires skills which make him job ready.
* It makes people financially stable, too. An educated person on an average is able to afford a decent livelihood.

**CURRENT AI APPLICATIONS IN EDUCATION SECTOR:**

* **Customized learning content for students:**

AI systems are being used to customize the learning materials and timetable for students. Machine learning helps to make a customized profile for each student based on their learning ability, preferences, and experience. It is expected that by 2024, 47% of learning management systems will be using AI powered technologies. Instead of a teacher making the same curriculum for different students, it will be tailored according to the student needs using AI and machine learning. According to Forbes, These e-learning tools are expected to reach 6 billion dollars net worth by 2024.AI also have a follow up system for students to provide feedback to their professors to know the areas where they are struggling,hence, improving the education system.

* **Use of voice assistants to help student navigate campus and its resources:**

Different voice assistants like Amazon Alexa, Google Home, Apple Siri, Microsoft Cortana helps students to interact with educational materials without interacting with their teachers. Some universities have started handing out these voice assistants to the students instead of traditional books as these makes it easier for students to research and find topics. For example, Arizona State University in the US gives its new students Amazon Alexa to make them familiar with their campus and surrounding environments.

These voice assistants helps students to navigate their campus resources,find answers related to their universities and can be customized according to the student’s daily schedule and courses.

* **Helping educators with their organizational tasks:**

Teachers generally are tasked with many organizational tasks apart from conducting classes such as evaluating assignments, ordering and managing classroom supplies, updating schedules, responding to parent’s inquiries, dealing with student issues such as absence or late arrivals, booking field trips and many other tasks which helps aide learning.These tasks over burden the teachers and they end up spending half of their time on non teaching work.With Ai introduced in the education sectors, they help in these non teaching tasks.They also speed up the process and reduces the burden of a teacher.They can handle repetitive paperwork giving more time to teachers to focus on other areas. AI also helps education administrators in budgeting, managing expenses and payroll, course management and enrollments services.

* **AI for special needs student:**

AI is being used to help impart education to special needs students in an easier and more interactive way. For example, voice assistants are being to used to help blind students to read passages or google their querieswhich makes it easier for them to learn without even a teacher or any other person.

* **AI for early childhood education:**

In early childhood education sector, AI is being used to create games which help students enhance their local skills and creativity. With machine learning, these games adapt according to the child’s learning ability.

* **Controlling smart devices in a class:**

AI is being used to control smart devices in a classroom such as turning on lights or fan as well as using voice assistants to read a chapter or a passage.

* **AI for learning a new language:**

AI is nowadays increasingly being used in mobile and desktop applications to help students learn a new language. For example, an application named duolingo customizes the quizzes according to student performance and suggests lessons based on that

* **Checking grammatical errors:**

There are various websites which corrects a paragraph for students using AI powered technologies which in turn helps foster their writing skills.

* **Data analysis:**

Nowadays, most of the institutes uses AI to analyze data and interpret results. They also use AI algorithms to predict student enrollment for coming years.

* **Scheduling Staff and managing substitutes:**

AI is being used by institutes to mange staff schedules and provide substitute teachers based on their experience and subjects. Machine learning can predict the highest qualified substitute for a teacher based on the specified factors hence improving the quality of education.

* **Cybersecurity:**

AI is helping institutes to report cyber threats and prevent themselves from any cyber crime or threat.

* **AI to monitor safety of students:**

AI is currently being used to track potential danger near school zones, hence, increasing the school and student safety.

**A NEW APPLICATION THAT MIGHT BENEFIT THE EDUCATION SECTOR:**

**Online Lectures/Classes recommendation App:**

Most of the time, student face a lot of problems looking for online classes and lectures for specific subjects. If there will be an app which recommends the online lectures to students and tell them specific combination of lectures which together help them accomplish their goal, that will help students reach their academic as well as professional goals faster.

This App will take some parameters like what does the student want to learn, how much experience they have, what pace they want to learn and then recommend an online course which will get customized according to the student’s learning goal and capability.

The best part about this app would be the course that it will recommend would not be from a single website or a tutor but a combination course which has combined videos from different course websites and sources.

Diagram

Description automatically generated

**COMPANIES WITH THEIR AI OFFERINGS FOR EDUCATION SECTOR:**

* **Squirrel AI:**

It is an online edtech company based in China. It is first Chinese Ai-driven adaptive learning solutions provider which facilitates high quality, customized K-12 after-school tutoring. It has an advanced real time evaluation system and has more than 1,700 schools in over 200 cities across the country.

* **Carnegie Learning:**

It is located in Pittsburgh, Pennsylvania. [It](https://www.carnegielearning.com/) provides K-12 education solutions for mathematics, world languages, literacy & ELA, and applied sciences. One of its product-MATHia® with LiveLab, was recognized as the “Best Artificial Intelligence/Machine Learning App” at Tech Edvocate Awards held in 2019. It uses AI and cognitive science to offer smart middle school and high school math learning solutions for students and provides them with 1-to-1 feedback.

* **Cognii :**

It is one of the leading edtech companies that offers best-in-class artificial intelligence-based products for education and professional training. It has collaborated with numerous organizations to deliver superior and cost-effective learning solutions. Cognii Virtual Learning Assistant (VLA) is one of its award-winning products, is a virtual assistant designed for educational conversation and offers personalized learning, intelligent tutoring, and open response assessments.

* **Nuance:**

**It is located** in Massachusetts, U. S .It offers artificial intelligence solutions for the healthcare, financial services, and education industries. It has gained recognition in the edtech industry for its advanced speech recognition software and solutions. The Dragon Speech Recognition software by Nuance helps students and teachers – especially the ones with limited mobility – by transcribing over 160 words per minute. It also provides detailed feedback and student progress assessments and offers effective lesson plans.

* **Blippar:**

It is located in London, [and](https://www.blippar.com/) is one of the leading tech companies in the U.K. It specializes in Augmented Reality (AR)-based content creation and publishing for the web and smartphones. Its main products are in-house bespoke content creation platform WebAR, and proprietary content publishing platform Blippbuilder. It is known for producing exclusive AR campaigns for partners including Jaguar Land Rover, Porsche, Cadbury, PepsiCo, L’Oréal, GSK, and Procter & Gamble.

* **Century Tech:**

[It](https://www.century.tech/) is an award-winning AI-based edtech platform located in England, U.K. It combines AI and neuroscience to offer learning solutions in English, math, and science for primary and secondary schools and colleges. It has a team comprising master teachers, technologists, and neuroscientists, who provide students with intelligent, personalized learning modules to improve their understanding and engagement.

* **Querium:**

It was established in 2013.It is a leading edtech company known for its artificial intelligence-based online assessment platform for science, mathematics, and engineering. It is known by its easy-to-use interface, patent-pending expert system, and advanced simulation technology. Its personalized lessons help students master important STEM skills through step-by-step tutoring assistance. Its StepWise Virtual Tutor replicates a human tutor and is available for students 24\*7.

* **HowNow :**

It is based in London, U.K., [It](https://gethownow.com/) is an edtech platform offering AI-based solutions for leading corporate companies worldwide to help them with faster onboarding and upskilling of employees. It specializes in business training, employee training, upskilling and workshops, and corporate/professional training. It uses real-time data to enhance the performance of employees and identify their weaknesses.

* **KidSense:**

[It](https://kidsense.ai/) was developed by American edtech company Kadho.It is a platform for embedded automatic speech recognition (ASR) technology and Edge-AI. Its educational AI tools, including the speech-to-text tool, are mainly designed for children to help them take notes faster and practice vocabulary more effectively. It was acquired by ROYBI in February 2020.

* **Practically :**

It is an edtech startup in India.It has a self-learning app which helps students with better understanding of various academic concepts and offers interactive video content through AI solutions.  It is known for its AR/VR learning solutions.

**How AI applications increase the productivity in the education industry?**

* **CASE STUDY 1: DUOLINGO APP**

**AI TECHNOLOGIES USED: AI for course curriculum and deep learning for translation**

Duolingo is one of the biggest e-learning platforms and one of the most downloaded educational apps.It was launched in 2011.It’s success can be attributed to AI and machine learning as AI drives everything from the company's product development and user retention efforts to its recruitment priorities and revenue strategies.

It all started in 2012 when Duolingo’s research director Burr Settles used his machine learning background to figure out which model works best for language learning. The space repetition concept, which holds that people learn best through brief study sessions spread out over time rather than cramming, was finally implemented by the corporation under his leadership.

According to Settles, a key component of the introduction of Duolingo and its game-like curriculum was that plan for how frequently one should practise a language. Another early AI research focused on course level placement, trying to decide where to place new language learners so they feel sufficiently challenged to return.When they first started,they lost many learners because they used placement test which was very easy for some of the users.Then,they came up with AI powered adaptive test which made the recommendations more accurate and user friendly.

In its flagship language-learning programme, Duolingo is currently increasing the usage of AI. Content development, personalisation, and cognitive modelling are the main areas of concentration. In terms of course curriculum, Duolingo uses AI, while deep learning is used to translate English coursework into other languages and to enhance comprehension of word

frequency and meaning.

* **CASE STUDY 2: BYJUS AND OSMO’S COLLAB**

**AI TECHNOLOGY USED: Computer Vision and recommendation system**

A new software called Disney Byju's Early Learn, targeted at children in grades 1-3, was released in June as a result of the Osmo-Byju partnership. Byju and the Walt Disney Company collaborated to create the app, which incorporates several of the studio's well-known character franchises from films like Frozen and Cars.

The main feature of the app is how offline learning can be combined with physical materials like worksheets, online engagement, assessment, and real-time feedback. The technology computer vision used by Osmo is useful in this situation. The image of a worksheet placed in front of the tablet is acquired by the programme using computer vision through the use of a tablet's selfie camera and a neatly attached reflector. The work a youngster has completed on the worksheet is then evaluated, and feedback is given.

Processes that previously required manual coding are now automated. A rule-based method would have been necessary, for instance, to anticipate a child's potential strengths, but with contemporary AI software, one can say, "Don't worry about rules, we'll construct them on the go," the osmo head added.

Data is one of the essential components of AI, which means that the platform with the most users is Byju's, the undisputed market leader in India. Byju's has about 35 million students registered on its platform, which gives it enough information to consider exercises like categorising pupils in various ways, including the the way they learn, what hikes their interest and so on.

The incorporation of such software triples the revenue of Byjus’s.

**ADVANTAGES OF AI IN EDUCATION SECTOR:**

* **Well-Ordered Information:**

These days, it is uncommon for professors and students to search the library for any materials. Today, we have instant access to anything we desire owing to Google. The internet contains the solutions you need, whether you wish to locate materials for your work or hire an essay writing service to complete your citation. Finding these materials, though, is a task in and of itself.

Today's platforms, like Quizlet, may assist students by giving them exactly what they need. They provide you with the necessary study resources, eliminating the need for guessing in creating personalised study schedules.

* **Personalized Education:**

Personalized learning is arguably the most impressive application of AI in education. A general lesson plan is being replaced with student-specific learning experiences in an increasing number of schools. There is a cap on the number of kids that teachers can directly attend to in a classroom. Instead, with the consent of the student's guardian, these AI solutions can gather information about the student's talents.

Based on a student's skills and shortcomings, AI may introduce courses and challenge them in the best way possible. Platforms like Kidaptive and Century Tech were created specifically to give pupils personalised lesson plans. They can, at most, use the underlying trends to perform predictive analysis on students' academic achievement.

* **Better for Special Needs Students:**

AI is significantly enhancing the lives of people with disabilities. Offering better resources to the disabled is one area where AI truly shines, similar to tailored learning. For pupils who have trouble writing or have restricted mobility, speech recognition software like Nuance can help translate words. These solutions can assist teachers in providing pupils with improved study resources that better meet their individual needs.

* **Immersive Education:**

For a long time, our educational system has prioritised memory retention over comprehension. With AI, you can make that modification. AI has the potential to create a dynamic learning environment in the classroom when combined with virtual and augmented reality. Students can learn about the universe, see famous landmarks, and much more. Avatars and digital assistants, for example, can extend this learning experience outside of the classroom.

* **Advanced Tutoring Systems:**

Though ITS is not a novel idea, AI has helped smooth out some of its jagged edges. Teachers and tutors are able to better assess information thanks to intelligent moderation. It will improve the grading procedures, which will enhance their effectiveness in the classroom.

Patterns can be recognised by AI systems, which can then notify teachers about them. Thus, teachers can gain a better understanding of their students' study patterns and design a new study programme that will suit their needs.

**DISADVANTAGES OF AI IN EDUCATION SECTOR:**

* **Cost:**

Even while AI is extremely clever, it also has a high price. The expense of upkeep and repair is substantial in addition to the product's high price. The amount of power needed to run schools will rise rapidly as AI requires more digital equipment. In order to offset the costs, schools will need to increase their budget. They will additionally need to develop alternatives to balance out power use. As a result, only institutions with adequate funding currently stand to gain from AI.

* **No Personal Relationship:**

These systems can replace teachers in many ways if and when we entirely rely on AI for the educational process. The interaction between teachers and students and how interpersonal relationships affect conduct make up a significant portion of school. We risk becoming totally reliant on technology instead of improving the efficiency of education. AI will only make us more dependent on technology if we aren't already.

* **Joblessness:**

AI may soon replace many educational employees, despite the fact that the software business may be flourishing. AI has an answer for everything, from managing the administration to instructing. The number of students in a class is unrestricted with online education. Additionally, AI may be the final straw that causes the educational sector to experience significant unemployment.

* **Incorrect Access to Information:**

Nowadays, there is no other option except to digital information. However, the students' data could also be vulnerable to hacking, just like any other technology. Schools always run the danger of personal information being misused if it comes into the wrong hands.

There is no denying that AI has a lot of promise. The claim that the benefits exceed the drawbacks is perennial. To what purpose is the question. Our educational system needs to be updated badly, and AI can point us in the correct way. However, it is crucial that humans set boundaries for how much power we cede to robots and their intelligence.

**ETHICAL CONCERNS OF AI IN EDUCATION SECTOR**

* **Privacy:**

Many AI systems request users' permission before accessing and exploiting their personal data in ways they might not fully comprehend. Think about the "Terms & Conditions" that are frequently provided while downloading new software. Users might simply click "Accept" without reading and considering all of the possible uses for their data. Or, if they do read and comprehend it, there are other subtle ways the programme might be utilising their information, such as the system being aware of their location. Additionally, others contend that if platforms are made a requirement for curricula, parents and kids are being "forced" to give their data.

* **Surveillance:**

A user's interaction with a system may be tracked by AI algorithms, which results in a more individualised experience. Systems that pinpoint a student's performance's strengths, shortcomings, and trends may fall under this category in education. Although teachers do this to some extent in their instruction, Akgun and Greenhow warn that doing so "may limit [student] engagement" and "make them feel unsafe to take ownership for their ideas."

* **Autonomy:**

Students and teachers may find it challenging to feel independent in their work because AI systems rely on algorithms, such as predicting how a student may fare on a test. Additionally, it "raise[s] problems about fairness and self-freedom," according to the scholars.

* **Prejudice and bias:**

These characteristics can manifest themselves in AI systems in a variety of ways, for as through the translation of gendered terminology ("She is a nurse," while "he is a doctor"). Every time an algorithm is developed, according to the academics, "a set of data that represents society's historical and systemic biases, which ultimately morph into algorithmic biases, is likewise built." We can observe numerous gender and racial prejudices in various AI-based platforms, despite the fact that the bias is implicitly incorporated into the computational model.

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