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Chapter 9
Simulation of Human Brain:
Artificial Intelligence-Based Learning

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ABSTRACT

AI is a branch of computer science that gives the ability to a computer to think and make decisions like humans. It stimulates the human brain in the computer and makes appropriate decisions when required. AI-enabled education impacts the designing of curriculum, mode of instruction, and many more. The use of these tools revolutionizing the education sector with the progression of ICT tools have now become AI-enabled. The main feature of an AI-enabled tool is personalization. These AI-enabled tools work like intelligent assistants for the students. The intelligent system having features like answer the queries of the students, give assistance, support learning, provide or take assignments, and provide reinforcement material according to their opted courses. A teacher has a minimum intervention with this process and has the role of a facilitator only. This chapter concludes that the AI-enabled teaching-learning process can't replace the classroom teaching; instead, it is handy. In the future, AI could replace the need of a teacher in class to some extent.

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1. INTRODUCTION

In many science fiction movies, we have seen the role of AI. In the education domain, AI is more than science fiction (Subrahmanyam,2018). There are credit systems in each education domain, and it has been offered by the MHRD in India to pass a course on the Swayam portal that is equal to the credit of an Indian university program of language education (Kashtwari,2019). Education using AI is much smarter than language learning and educational technology. Countries like the USA and China are in front of AI centered education and put AI in the classroom, too. As time passes, the education system realizes the role of AI in Education and find that teaching using AI techniques affect the way of teaching and learning. The AI may impact the designing of curriculum, mode of instruction, assessment preparation, and submission, but the advanced education tool of AI may or may not be capable of understanding and integrating the product and services of the system in the future (Hammond,2019).

In today's scenario, we are going rapidly towards automation in every domain, and the education sector is also not untouched from this transition. The education sector is also using the online tutorials, smart boards, intelligent tutorial systems, chatbots, robots in the classroom to teach the students as technological advancements. This technological advancement is producing new opportunities for different sectors. Technological progress always raises the question of whether it is capable of revolutionizing higher education. This progress gives a fear which arises due to these applications of Artificial Intelligence. Different parameters are used in the education sector. These parameters should always be taken into account before putting theses AI advancements in the education sector before benefitting the teachers and students.

A learner starts its education when he or she is an infant and ends as a higher education student. The AI will impact the individual learning application as a teacher and learner.

This technological advancement of AI, start with the birth of ICT when the education system was using different ICT tools in the domain (Lieto, 2016). These ICT tools make the stakeholders i.e., teachers and students, curious to enhance the capability of existing tools as AI-enabled. In point of view of a single stakeholder, AI tools provide a viable solution in a certain way, to give the automated assistance. AI provides virtual support, which is helpful to stakeholders as it is available according to the time of the individual. This AI-enabled education gives us a rethink scenario as it is creating an impact on our convolution learning. Newly developed AI-based applications will provide a chance to introduce the new versatile curriculum to the education system. In the last decade, these changes taken place gradually and not noticeable significantly by the majority of universities. The impact of these changes used in many decision-making of education systems in the whole of the world.

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Nowadays, the role of this Artificial intelligence policy is going to revolutionize the education system in the entirety of the word (Ventura,2017). This chapter discusses the different aspects of the usage of AI in the higher education sector, covering the teacher and learner collaboration using AI, Human Intelligence and Artificial Intelligence, Intelligent Assistants in AI, importance, and role of AI in education, etc. After reading this chapter, the learner will be well aware of the current and future impact of AI in higher education.

2. TEACHER AND AI COLLABORATION

Many tools of Artificial Intelligence is used to enhance the skills and testing of primary students. AI-enabled educational tools are in their evolving stage, so students and teachers are also in the learning phase and trying to do differently and more using these tools. These tools give the freedom to teachers and help them in a personalized manner. These AI tools have a uniquely human capability where an automated machine lacks. This combination, i.e., AI-enabled tools and teachers become the best and give the best outcome for the students. Artificial Intelligence is a sun rising technology, and a lot of future work will be completed using this, so it will be suitable for our students that they will be exposed to this technique (Holstein, 2016).

3. HUMAN INTELLIGENCE AND ARTIFICIAL INTELLIGENCE

Human Intelligence is the sum of those cognitive abilities that give the human being a relative autonomy, which can be categorized as "intelligence profiles" or "multiple intelligences (Shabbir, 2015). Computational intelligence (Manju, 2014) is known as superior to Human Intelligence due to its memory capacity, but Computational intelligence is not capable of interpreting meanings. Hence Computational Intelligence is used for information processing but doesn't know what is processed. On the other side, the human brain has the capacity of processing with the knowledge of processed data. So to give the intelligence capability to the computer system, the term Artificial Intelligence comes into existence (Vassileva, 2008). AI is a branch of computer science that is used to design and develop an intelligent system, i.e., the systems which behave and make decisions like a human (Xia, 2020).

The term AI was come into existence in 1956, at a conference at Dartmouth College, in Hanover. The AI was started with the development of "Turing Machine" by the famous scientist Alan Turing (Saygin,2003). This machine was capable of processing different types of calculations. Alan Turing also developed a Turing

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machine test in which a machine thinks and makes a decision like the human, and an observer cant found whether the decision was taken by machine or a person. Other scientists named McCulloch, Turing, von Neumann, Wiener, and Pitts, Gardner, also contributed to the development of AI techniques in the early phase (Mainzer, 2020). There are two types of AI, i.e., Weak AI and Strong AI. Weak AI is only restricted to the use of computers to study the cognitive possibilities of the human being; and a strong AI, which is oriented to linking the AI and human intelligence, and seeking ways to connect them even more (Shabbir, 2015).

4. INTELLIGENT ASSISTANTS IN EDUCATION

AI-enabled educational tolls comprise the smart tutoring system, conversational educational system, chatbots, and robots (Heo, 2019). These educational tools can answer the queries of the students, give assistance, support learning, provide or take assignments, and provide reinforcement material according to their programs. These tools offer a personalized experience for each student, i.e., educational material changes according to the pace and behavior of the student. These assistants gather the individual learner data and predict the success and failure of the student. These assistants also identify the learning gaps, highlight the weakness and strength of the student, and give suggestions to overcome the weakness. Assistants can work individually or with the collaboration of human teachers. It has customized exercises, learning curriculum, attendance, and sessional marks for each student. An Assistant can work independently, but a teacher needs to monitor. In this way, AI and teacher will create an immersive learning experience together for the students (Duque, 2018).

4.1 Voice Assistants

Nowadays, the teachers are using the voice assistants in the classroom. Voice assistants such as Amazon Alexa, Google Home, Apple Siri, and Microsoft Cortana are some examples that are used by the students to interact with educational material without the interaction of the teacher. The students use these devices with teaching material and additional educational assistance at the home place or in educational institutes. In the higher education scenario, Universities are also giving voice assistant to the students in place of their books and E-resources. Many universities in the world are giving the Amazon Alexa voice assistant to complete the educational and campus needs. Alexa provides a personalized environment for the student and provides the answers to the student query regarding the education and campus of the university. This voice assistant reduces the human intervention and cost of hard books, which

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can be out of date in the future. In the future, more students and teachers will use these voice assistants and will be the need of the hour (Callaghan, 2019).

4.2 Chatbots

Chatbots are the software that answers the queries of the user without the intervention of humans. Many domains like banking, telecommunication, and others are using the chatbots in place of humans. In the education sector, chatbots are also used in the different process like admission, career counselling, etc. Niaa is the example of a chatbot that helps the aspirant to get admission in an educational institute. Niaa is a brilliant fusion of advanced Artificial Intelligence and personalized Machine Learning, Niaa is built to intelligently engage your prospects based on their journey, providing them with delightful counseling experience. Unlike other chatbots for education, Niaa is built to strike a real conversation with aspirants prospects. So instead of relying on plain chat workflows, Niaa draws its learnings from the tightly coupled NoPaperForms platform and provides an experience like no other (Shafi, 2020), (Anshu, 2019).

4.3 Recommendation System

The software which retrieves and filters the data from the existing content according to the user profile, behaviour, and past browsing is called the recommendation system. The Recommendation system usually covers the e-commerce domain. Amazon, Facebook, youtube, Flipkart, Netflix are the leading website which uses the recommendation system and gives the suggestion to the user. In the education domain, the first use of recommendation systems is to assist the students in their educational choices, i.e., where a student gets the admission, the information about the recommended university, teachers, or, moreover, support choices of speciðc academic courses or disciplines. The recommendation system also recommends specific E-learning or online courses (Zhu, 2008), (Ahuja, 2019).

5. ROLE OF AI IN EDUCATION SYSTEM

Overall the integration of AI-enabled education drives positive outcomes in the domain. But an individual may have different effects of AI-based education. AI in education can be grouped into five general roles:

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1. **Automation:** The most straightforward role of AI is the automation of students related activities which involves grading, digital asset categorization, or timetable scheduling. The teachers can spend more time with the students.
2. **Integration:** AI, with the combination of Machine Learning or IoT (Priyadarshni, 2019), (Rajput, 2016), (Tayal, 2019), (Pandey, 2019), (Solanki, 2018), (Rameshwar, 2020) can give a personalized experience to the students.
3. **Acclimation:** Nowadays, students are spending their time online. With these new conditions, AI-enabled education can help students to the pace of technological change.
4. **Delineation:** The learning of every student is different from the other students. We change educational policy and curriculum according to the student's needs. But it is always tricky to find whether a teacher is delivering the content according to the students. AI-based analytics helps to spot critical trends and helps the teachers to design the most effective classroom experience.
5. **Identification:** Using AI-enabled education in a classroom helps to identify critical areas for student and teacher performance. AI can help spot and remedy potential problems in their formative stages.

6. IMPORTANCE OF AI-ENABLED TEACHING

The Artificial Intelligence-based educational system is giving positive outcomes in many countries. Following are the essence of AI-based education system (Nichols, 2006).

1. **Adaptive Nature:** AI-based education learning's most prominent importance is its personalization, according to the individual learner. Some of this is already happening through growing numbers of adaptive learning programs, games, and software. These systems give recommendations according to the need of the learner, assist in learning tuff topics or topics where the student lacks on with the student pace and time. The teacher only intervenes when it's required. Adaptive learning has already had a significant impression on the education system across the world. As AI advances in the coming decades, adaptive programs will likely only improve and expand.
2. **Improvement in existing courses:** Every teacher is not an expert in delivering the content and doesn't know the gaps in his/her lectures. The educational material which is provided to the student may be confusing to the students about the different concepts. AI-enabled education can quickly solve this problem. Simplilearn and Coursera are the E-learning platforms that are addressing these problems using AI-enabled teaching. AI-enabled education system sent

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an alarm to the teachers that most of the students make the same mistake when an assignment is submitted. Then the teacher gives a hint to the students, how this mistake can be resolved. This type of AI-enabled education finds the gaps and suggest the teacher overcome these problems. The system also considers the fundamental problem of the students where they are lacking.

3. **Additional support from AI tutors:** Classroom teaching can not be replaced by online teaching. The classroom instructor or tutor delivers the lectures, and the machines can not offer this type of talk. However, due to lack o time and spending more time on the internet, in the future, we will find more tutors online in the comparison of classes. Some AI-enabled tutoring programs already exist, which are helping the students in different subjects. These tutorials only teach the fundamentals. However, it can not cover the high-order thinking and research problems. This type of problem can be solved by real-time or classroom tutorials. But in the future, it will be covered by AI tools.
4. **Feedback System:** The AI system provides feedback about the success and failure of the courses opted by the students. The online AI system shows you the performance of a student and gives feedback to the students about the lack of the student. These lacks can be improved under the guidance of the teacher.
5. **Usage in Daily Life:** Most of the stakeholders don't notice that they are getting regular information using AI-enabled system like google and amazon. Google gives information based on GPS location, and amazon provides recommendations based on past purchases. Siri provides suggestions according to your commands. Facebook sends ads on your page according to your interest. If a student is interested in any online course and browsed one time or search that course, then all of these tools will give you the specific recommendation. This kind of smart system affects your personal, professional, and academic as well. In the future, the student will have a more personalized experience in comparison to today as technology advances.
6. **Role of Teachers:** The role of the teacher is changing in education with the advancement of intelligent technologies. AI system is already taking assignments, giving tutorials, improving student skills, as discussed in section 3. In the future, AI could replace the need of a teacher in class to some extent. In future teacher will be known as a facilitator.

7. CONCLUSION

The chapter starts with the introduction of artificial intelligence and the current scenario of AI-based education in different countries like India, China, and the USA. The AI-enabled education impacts the designing of curriculum, mode of

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instruction, assessment preparation, and submission. Every sector, including education, is automated, using online tutorials, smart boards, intelligent tutorial systems, chatbots, and robots in the classroom. This advancement in education is revolutionizing higher education. This revolution was started with the birth of ICT. As the ICT tools advances, teachers and learners become curious to make it more user-friendly and self-decision support. Nowadays, there are a lot of AI-enabled tools that support self-decision. This support and decision are available according to the time of the individual. Nowadays, the role of this Artificial intelligence policy is going to revolutionize the education system's entire word. Many AI-enabled educational tools are in the development of their primary stage, so not well known to students and teachers. These AI tools work in a personalized manner. These AI tools simulate human brain decision-making powers. The system which possesses such capabilities is known as an intelligent system and can assist the different student in a personalized manner. The intelligent assistant system can answer the queries of the students, give assistance, support learning, provide or take assignments, and provide reinforcement material according to their opted courses. These assistants are used to predict the success and failure of the student in his/her academic carrier. A teacher has only to monitor the teaching assistant. In this way, AI and teacher will create an immersive learning experience together for the students. Some examples of these intelligent assistants are voice assistant, chatbot, and recommendation system, etc. This chapter also highlights the role of AI, which covers automation, integration, Acclimation, Delineation, and Identification. The end section of this chapter the importance of AI-enabled teaching importance in current and future prospectives, which covers the adaptive nature of AI system, Improvement in existing courses, support for AI tutors, feedback system, and daily usage of AI in the education sector. In the last, the role of the teacher will be changed as technology advances. In the future, AI could replace the need of a teacher in class to some extent. In the future, teachers will be known as the only facilitator.

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Chapter 10
Influence of Artificial Intelligent-Based Vocational Courses on Self-Concept of Students

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ABSTRACT

Artificial intelligence (AI) these days is becoming a more popular choice among students because of its large scope in different fields of life and career. The chapter is based on how the vocational courses of AI have its effect on the students' self-concept. The two groups of students have been taken for the study: one group having vocational trade as AI and basics (150 students) and another group having non-vocational subjects (150). The chapter has two goals: to compare level of self-concept of students with AI-based vocational trade subject and students without any vocational courses and to analyze gender difference among students in relation to self-concept. The samples were selected by simple random sampling. T-test analysis showed that the two groups had significant difference between their levels of self-concept. The students with AI-based vocational subject have a higher self-concept than that of students of non-vocational subjects.

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