Artificial Intelligence in Education: Innovative Applications and Future Prospects

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Abstract. A collection of methods that let computers mimic human behavior is known as artificial intelligence. Since its introduction in the 1950s, the idea of artificial intelligence has been applied in many facets of modern life, with significant advancements occurring daily. It has active uses in a wide range of fields, including education, sports, manufacturing, finance, and health. The simultaneous introduction of technical advancements and innovations into training and educational settings has a direct impact on the nations' levels of development and education. Having enough data is the most fundamental prerequisite for developing artificial intelligence algorithms. Data collection from a wide range of education stakeholders, including students, instructors, parents, school staff, administrators, and employers, will be feasible during this process. These statistics, which are collected fully, will serve as the foundation for software that will be created using artificial intelligence to understand learning patterns and processes, as well as offer the chance to create data-supported strategies generally for education policies. The idea of artificial intelligence is described in this paper along with its applications in training and education, along with some of its benefits. Our nation's artificial intelligence initiatives were examined, and recommendations for their use in education were made.

Keywords: Smart technologies; Intelligent tutoring systems; Educational data mining; Digital transformation; Artificial intelligence (AI)

1. Introduction

The generic term for the concept of creating machines with entirely artificial tools that can display intelligence is artificial intelligence (AI). human-like motions and actions, yet without the need of any live thing. It is a collection of methods that let computers mimic human actions [1].

Despite being around since the 1950s, the idea of artificial intelligence (AI) motivates computer scientists to create new, more sophisticated technologies. This generates enthusiasm for people who utilize these technologies on a regular basis. With new developments every day, artificial intelligence research has contributed to stretching the boundaries of creativity, particularly in topical years. Top corporations in the information technology (IT) area, with Google, Apple, Facebook, and Microsoft, have declared in recent years that the mobile-first world is over. They claimed that digital supporters and other service area will serve as the main information source and carry out their duties in the AI-priority world. The United Arab Emirates made history by establishing a Ministry of Artificial Intelligence [2].

Numerous approaches can be considered in order to comprehend and apply AI. When there are numerous variables, the secret to machine intelligence meaning, rationality, and action, followed by experience-based adaptation [3]:

Finding and identifying significant items or ideas in large amounts of data is known as meaning.

Reason: Comprehending the broader picture and formulating a strategy to accomplish an objective.

Action: Outlining the best plan of action or getting right to the point.

Adaptation: Increasing the intelligence of algorithms by modifying them in light of experience at each level.

The advancement of mobile technologies has made the human world smarter, more data-productive, and more technologically advanced. The Here, the devices' software serves by way of a gauge of intelligence. The applications of artificial intelligence (AI), which are what are commonly referred to as "smart technologies," are growing daily, and the field of AI is becoming more and more

expansive with time. These technologies are now used on a regular basis by both people and organizations. Artificial intelligence (AI) has been applied in almost every industry, particularly in industries like banking, healthcare, automotive, manufacturing, sports, and education. The volume of data generated across all industries and daily life can be seen as the foundation of this development in the modern world, where artificial intelligence will influence humanity's destiny. The question of how and why these data will be processed is still relevant as we move through the digital revolution. Nowadays, data is much more crucial than raw commodities were during earlier revolutions.

Here is the remainder of the article. The article's second section explains how AI is used and how it contributes to data production. The fourth segment provided an explanation of Turkey's AI strategy and methods, while the third half provided examples of AI's application in education. The study was finished and a conversation and recommendations for AI applications in schooling were given in the conclusion section.

2. Artificial Intelligence Use Areas

The 70-year development journey that began in the 1950s, when British mathematician, computer scientist, and cryptologist Alan Mathison Turing proposed AI applications, has expanded to tremendous proportions. Back then, the concepts that began with determining if the responses to the questions were provided by a human or by a machine behind a curtain applied with many services in many phases of us manage to survive to this day.

2.1 Finance Use Area. Lately, big businesses and organizations have begun to show interest in AI technologies. If the AI applications being used are precise and intelligent, the balance sheets of companies can be significantly improved. AI presents businesses with a plethora of opportunities. Both the way new computers operate and the way existing computer systems function have altered as a result of AI technology, and corporate and specialized solutions offer benefits. These advantages are offered by AI-based applications not only on the front end but also in server systems and economic processes, including marketing, fraud detection and prevention, data security, network security, sentiment and news analysis, customer service, algorithmic transactions, loan/insurance, portfolio management, and financial product recommendations [4].

These intelligent systems are utilized by businesses to make decisions now and/or in the future, but from the standpoint of the client, put differently, users have a crucial role in maintaining, growing, and allocating their financial assets. Nearly everyone uses AI applications in the financial industry, from the most novice to the most experienced users. kids, etc. Numerous personal details build a profile that the bank uses to assess the person and produce a risk map and credibility assessment. Clusters in society are being formed and groupings are being added to the profile pool as a result of the accumulation of this data. These intelligent systems are utilized by businesses to make decisions now and/or in the future, but from the standpoint of the client, put differently, users have a crucial role in maintaining, growing, and allocating their financial assets. Nearly everyone uses AI applications in the financial industry, from the most novice to the most experienced users. kids, etc. Numerous personal details build a profile that the bank uses to assess the person and produce a risk assessment and reliability assessment. Clusters in society are being formed and groupings are being added to the profile pool as a result of the accumulation of this data.

Even while this mode of expression could appear unusual at first, it won't be all that different given that all of the data going through the program is personal information. For instance, giving the bank personal information on a loan application, such as age, education, employment, income, gender, number of children, etc., creates a profile that the bank can use to assess the applicant and construct a risk map and credibility. Clusters in society are being formed and groupings are being added to the profile pool as a result of the accumulation of this data.

Making predictions based on historical data has become considerably simpler when making business decisions because to advancements in artificial intelligence (AI) and the reduction in the cost of processing data and extracting useful information from it using big data analysis techniques. A distinct management approach is made possible by data-driven management decisions, where managers of businesses ask the appropriate questions of robots rather than human specialists and use

the responses to inform their choices [5]. The financial industry is unquestionably one of the systems where smart technologies will be used to make the best decisions. Data is used in business and transactions in the finance industry, one of the industries where statistical information is routinely and legally required. This industry has benefited greatly from advancements in data processing equipment, estimate and modeling skills, and the creation of novel algorithms and computer methods.

2.2 Healthcare Use Area. Laboratory reports, imaging reports, pathology reports, diagnostic reports, and drug information are among the many types of data generated daily by hospitals, clinics, and medical and research institutions [6]. One of the major issues facing physicians is the Rapid growth of healthcare data. According to recent research, big data and artificial intelligence (AI) solutions are the way to handle the explosion of big data and satisfy the technological, financial, and social needs of the healthcare industry. It is frequently challenging and demands a high level of data analysis expertise to analyze such vast and complicated data. The interpretation of findings and suggestions based on medical experience is the most challenging. These call for years of medical training, expertise, and specialized abilities [7].

Among the research projects that call for cooperation are AI solutions in the healthcare industry. Here, computer scientists with programming skills and healthcare professionals with medical understanding must collaborate. Studies in the health area are the greatest well-known, despite the fact that here are many multidisciplinary studies on this topic in the literature. Particularly in recent months, the significance of these investigations has become evident. The Covid-19 pandemic, which has impacted people worldwide, has highlighted the significance of applying AI in healthcare. AI is being used in health in a variety of ways, including robotic surgery, remote surgery, medication development and testing, and medical data security, in addition to disease detection and diagnosis. due to the fact that data is constantly generated in every aspect of the healthcare industry.

Data is created, gathered, and kept in a variety of formats in the healthcare industry, including digital, text, photos, scans, sounds, and videos. The quality of the data and every question that has to be addressed from the target data collection should be known before applying AI to the data. It aids in the development of the architecture, algorithm, and neural network for data type AI modeling [7].

Every day, health systems receive hundreds of data entries related to analysis, imaging, reporting, diagnosis, medication, and therapy. Even so, these statistics include crucial data for the healthcare industry; the constant growth of data causes issues for physicians. By associating patient data with earlier diagnosed and treated patient data, decision support systems enable physicians to receive assistance with diagnosis and therapy. To put it another way, AI technologies in the healthcare industry are the ones that will create solutions for systems like imaging (MR), tomography, ultrasonography (USG), x-ray, and angiography that produce a lot of digital data. Many diseases can be avoided even if the cause is not immediately apparent. There is a significant negative ratio between the number of doctors and patients, despite the fact that medical experience is necessary for estimates, suggestions, and explanations of results. AI technologies provide ways to overcome this shortcoming.

Research indicates that the healthcare AI business might expand at a 40% annual rate to reach $6.6 billion by 2021 and could lower the cost of 50% reduction in therapy [8]. By 2026, AI research might result in annual health industry savings of $150 billion [9]. AI-based effective solutions for the healthcare industry are always changing; instruments to reduce the workload for clinics and improve the efficiency of medical personnel's work; addressing healthcare shortages as labor demand rises; enhancing patient outcomes, quality, and efficiency; extending the access network and integrating health data across multiple platforms; Examples of these solutions include ensuring information security, increasing efficiency, transparency, and interoperability, among others.

The pharmaceutical industry is another sector that uses AI in health. Medication and treatment responses can vary from patient to patient. Thus, individualized care is essential for increasing patients' life expectancy, but identifying the criteria that should be taken into consideration while selecting a treatment approach is challenging. AI has the potential to eliminate "one-type" treatment and recommend individualized therapies, medications, and treatments, according to Dr. Bertalan Mesko, who refers to it as "the stethoscope of the 21st Century" [10].

2.3 Automotive Use Area. Cars are gradually changing since four-wheeled iron boxes to vehicles that fulfill their intended function. At the moment, inter-vehicle communication a well-known idea is used. This procedure will create a network of communication amongst cars, which will lead to fewer clogged roads and smoother traffic. In contrast to humans, this kind of AI system is built to make the required decisions right away [11].

The World Health Organization estimates that 1.35 million individuals worldwide lose their lives in automobile accidents each year. Additional Unprotected individuals, including walkers, cyclists, motorcyclists, and passengers, account for more than half of all fatalities. Additionally, the cost of these accidents' accounts for 3% of the GDP of the majority of nations. The leading cause of death, particularly for those between the ages of 5 and 29, is traffic accidents. Fascinating fact: whereas the number of automobiles in low- and middle-income countries accounts for 60% of the worldwide vehicle rate, 93% of traffic accident fatalities occur in these nations. Twenty to fifty million persons suffer non-fatal injuries as a result of traffic accidents. Many of them have injuries that have left them incapacitated.

If a list of the causes of road accidents worldwide is provided [12];

- Human error,
- speeding,
- driving while intoxicated or under the encouragement of other psychotropic materials,
- not wearing seat belts, kid seats, or motorcycle helmets,
- unsafe vehicles,
- unsafe road infrastructure,
- distracting driving,
- poor post-collision maintenance,
- The traffic laws are inadequate.

Human error is the most significant factor that automobile technology has left behind. Global traffic accident statistics have reached alarming levels [13]:

- Accidents claim the lives of 1.3 million people annually, or 3.287 people every day.
- Of them, 400,000 are younger than 25 (about 1,000 each day).
- There are between 20 and 50 million people who are injured or crippled.
- The global cause of death rate is 2.2%, ranking ninth.
- If nothing is done, the imitation on the data indicates that it will drop to fifth place in 2030.
- The total expense of traffic accidents is $518 billion.

Because of these findings, AI plays a significant role in motor vehicles. The goal of AI technology is to ensure that drivers drive safely and to reduce the likelihood of collisions between cars and vehicle-to-vehicle communication. When properly implemented, this technology will greatly enhance driving enjoyment, efficiency, and road safety [11]. Both at the user and production levels, artificial intelligence (AI) is now widely used in the automotive sector. Nowadays, a lot of industries have moved to smart production technologies and modified their automation systems to use AI. This is when the industry's employment of AI entered the picture.

2.4 Usage in Industry. AI technology significantly improves the production sector in areas like reusability, residual material amount, product design timeframes, and quality control. Manufacturers use artificial intelligence-based systems to analyze real-time data generated in their production processes in order to improve product quality, efficiency, and worker safety.

One of the AI technologies, machine learning, has made it feasible to evaluate huge amounts of data and deliver predictions. With the help of machine learning algorithms' pattern recognition capabilities, AI is able to independently produce knowledge from experience. AI is therefore essential to industry 4.0 [14].

As AI technologies are incorporated into factories and industrial facilities, the idea of Industry 4.0 is becoming more and more prevalent in our daily lives. Dark factories are used for production, which is tailored to the demands of business. These days, the human labor finds a place in better-suited roles. Intelligent technologies are employed in computations as well as in what is referred to as power. All

systems are notified in the event of a production line breakdown, and technical support can be started right away.

The entire world today acknowledges that AI technologies have a significant impact on and change production technologies. Because of this, businesses who hope to thrive in the coming ten years have already begun integrating AI into their R&D procedures, customer relations management, employee training, and hiring procedures [15]. Employees and manufacturers alike should adjust to the role of artificial intelligence in the sector in this direction. When applied to production systems, these technologies require personnel at the user and programming levels in addition to interpreting units and workers through the analysis of these systems' output.

2.5 Sports Field Use Area. AI is starting to show up in many facets of life, including sports. Sports teams, for instance, set up scouting squads to monitor player performance and make transfers based on predetermined standards. These performance data contain a large number of parameters. At this point, AI analyzes complex data using these factors to give the scouting team the information they require.

Artificial intelligence (AI) technologies have a big impact on sports games. In contrast, AI technologies are employed at numerous levels, ranging from the study of rival teams to the physical preparedness and working statistics of athletes. Actually, as part of an AI study, 400 sports branches' worth of data were used to create a brand-new game called Speed gate [16].

The 2012 film Moneyball, which was based on a true tale, focused on Oakland Athletics general manager Billy Beane, who had to start a baseball team on a very tight budget. The movie received an Oscar nomination. The manager discovered the answer in the AI program. After conducting data analysis, he assembled a team with a significantly smaller budget than other teams, and in 2002, this team achieved notable success by winning 20 straight games.

3. Artificial Intelligence in Education Area

The most fundamental prerequisite for developing AI algorithms is to supply enough data. Data from a wide range of education stakeholders, including students, instructors, parents, school staff, administrators, and employers, will be gathered during this process. Determining which dimensions will be taken at which educational level for each stakeholder is essential at the start of this procedure. For instance, when a youngster enrolls in school today, they begin their educational journey with only their identity information. Teacher observations serve as the basis for evaluations that are conducted throughout time. Regarding how unique the observations are for every student, there is no control mechanism. Because of this, it is crucial to gather information from children about the elements that will influence their learning at a young age and use it to inform the teaching process. These thoroughly collected data will serve as the foundation for software that will be created using AI to study learning patterns and processes, as well as offer the chance to create policies based on data generally for education policies [17].

Even if every industry is adjusting to AI technologies these days, educational practices which are the most crucial pillars of a nation cannot ignore these emerging technologies. Millions of people participate in educational activities in this field, and the outcomes of such endeavors have an impact on a nation's future. Individuals are the field's inputs and outputs. This is why essential tasks are completed. One of the necessities of our time is technology, which cannot be kept out of this sector. AI technologies are required in numerous areas, including career counseling, assessment and evaluation systems, instructional strategies, and educational content.

AI's effects on education are still far from taking a comprehensive approach. The majority of studies in the literature discusses AI's potential in education and outlines the advantages it will offer going forward [18–21]. Additionally, AI-supported training has begun to be implemented in a few fields, namely medicine, particularly in undergraduate and graduate education. Once more, these training components take the shape of tangible materials that support the course curriculum. In order to identify hip fractures on a plain pelvic video, Chi Tung Cheng et al. (2020) created an AI-based

medical image learning system and used it with a group of students. They used a standard educational approach with a different class of pupils.

Compared to the control group, the accuracy gain in the AI learning group was noticeably greater. The study showed that using AI to improve medical education is feasible [22]. Kharbat et al. (2021) examined the literature on the application of artificial intelligence in education for students with logical and developmental incapacities in another health study. They concluded that the possible use of health data in artificial intelligence is even more crucial after discovering numerous gaps in the application of AI to serve students with intellectual and developmental disabilities. For kids with intellectual or developmental problems, they developed a block diagram for the application of AI in the classroom [23]. In 2020, Mirchi et al. investigated a novel framework leveraging explainable AI for simulation-based surgical instruction, and evaluate the concept by developing an automated feedback platform called Virtual Operational Educational Assistant. Using four criteria, the Virtual Operational Assistant was able to accurately classify participants who were proficient and those who were not, with 92, 82, and 100% accuracy, specificity, and sensitivity, respectively. The educational framework presented in this study lays the groundwork for the possible integration of artificial intelligence (AI) and virtual reality simulation into surgical education [24]. Engineering education is another area that has been researched in a manner akin to that of medicine. The introduction, evolution, and prospects of AI-based smart engineering education were examined by Ouyang et al. (2020). According to the study, AI's primary contribution to smart engineering education is to provide direction for next teaching, learning, and design procedures [25]. A few studies have been conducted regarding the course to be taken and the policies to be decided upon for the use of AI in education.

The following is a summary of some challenges with the policies that need to be decided [26]:

- Traditional formal education institutions are undergoing significant changes, possibly even a paradigm shift, in digitally-driven knowledge economies.
- Many pre-service and in-service instructors are not prepared to accept and adapt new technologies.
- The protection of privacy and personal data from economic exploitation, unlawful disclosure, and other misuses is urgently needed.

It is a given that AI and machine learning algorithms will be used in education not just for in-class applications but also for studies conducted at institutions. As an illustration of this, Yurtsal and Kaynar (2019) conducted a study to use genetic algorithms to address issues that come up throughout the curriculum preparation process in the educational institution. Faculty curriculum issues were resolved using the algorithm created for the study, and the system's effectiveness was assessed [27].

AI makes it possible to automate fundamental educational tasks. The goal of the assignments and assessments designed for today's high school students is to analyze their level of competency, fill up their subject-matter gaps, and identify the career group in which they will succeed in the future. AI develops this process with planning by analyzing the student's data. AI is used in the initial stage to assess the student's knowledge and abilities. AI, which develops programs based on knowledge and skills, arranges them according to each learner since it is aware of their areas of weakness. With its individualized teaching, AI helps pupils discover who they are and become successful, job-loving persons in the future [28].

The variety of pupils' learning speeds has been explored, and individual learning differences in particular have gained attention in the area of education in current years. In practice, the most significant contribution of AI technologies will be their ability to be tailored to each student's unique learning style and speed. This will allow all kids to learn in classrooms at their own speed rather than necessarily at the same rate. With the help of these teaching strategies, quick learners will be able to advance more quickly and engage in repeated learning, which will help students who struggle with learning to understand the material.

It's possible that teachers are unaware of every error that pupils have made on assignments or assessments. AI has made it feasible to resolve this issue. In AI-supported applications, the teacher can give hints regarding the assignment or question to be answered if the student completes his homework incorrectly or completes a portion of it incorrectly. In this manner, after being fed data,

AI recognizes potential issues, utilizes previously generated data, and gives the student the appropriate responses by providing hints [18].

Another crucial component of using AI in education is career counseling. From the time they enter preschool until they graduate from secondary school, students are monitored throughout the system for a considerable amount of time. Teacher observations from earlier times to the present form the basis of this procedure. Many students would avoid the inspection of the teachers, especially in countries with dense populations and big class numbers. Furthermore, not every student exhibits the same learning style. Because of this, it is possible to draw fairly accurate conclusions about the domain the AI systems through the examination of both structured and unstructured data. It is possible to implement this orientation at the secondary school level. As a result, people in society who work in their preferred career will be happy in the future (Figure 1).

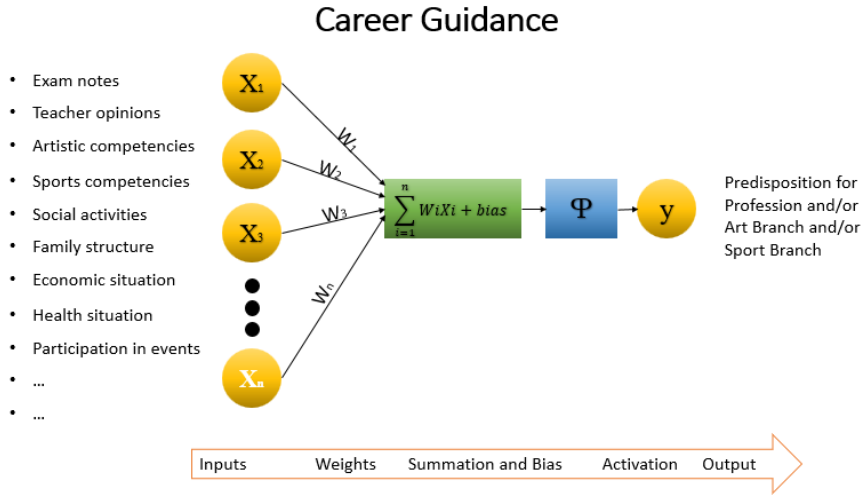

Figure 1. Artificial neural networks in education for career counseling

The following is a summary of AI's potential in education [28]:

- It has the ability to automate fundamental educational tasks like classification.
- It is possible to modify educational software to meet the demands of students.
- AI is able to identify areas in which teachings require improvement.
- Students can receive educational support from the AI-created instructional staff.
- Programs with AI help can give teachers and students insightful feedback.
- AI alters the way we locate information and engage with it (information interaction).
- AI has the potential to alter the job of educators.
- AI makes it possible to apply trial-and-error learning more actively.
- AI-powered data has the potential to transform how schools recruit, instruct, and assist students.
- AI has the power to alter what pupils learn, who teaches them, and how they pick up foundational skills.

The following is a list of the outcomes and benefits of implementing AI in education [29]:

- There will be intelligent course booklets and textbooks that may be modified to fit each student's preferred rate of learning.
- The times when the entire class receives the same instruction will eventually come to an end.
- The student's missing points will be identified immediately.
- Education will be provided based on the student's interests.
- All of the student's developmental history will be preserved.
- It will prevent the student from wasting time on useless information.
- There will be more students participating in the lesson.
- Students will be trained with greater confidence.
- Analysis will be done on both the student's incorrect points and the reasons behind them.

- The groundwork for personal education will be established since character analysis can also be carried out during student instruction.
- It is possible that every kid will have an equal opportunity to learn.

Figure 2 illustrates the benefits and possibilities of implementing artificial intelligence in education using a block scheme.

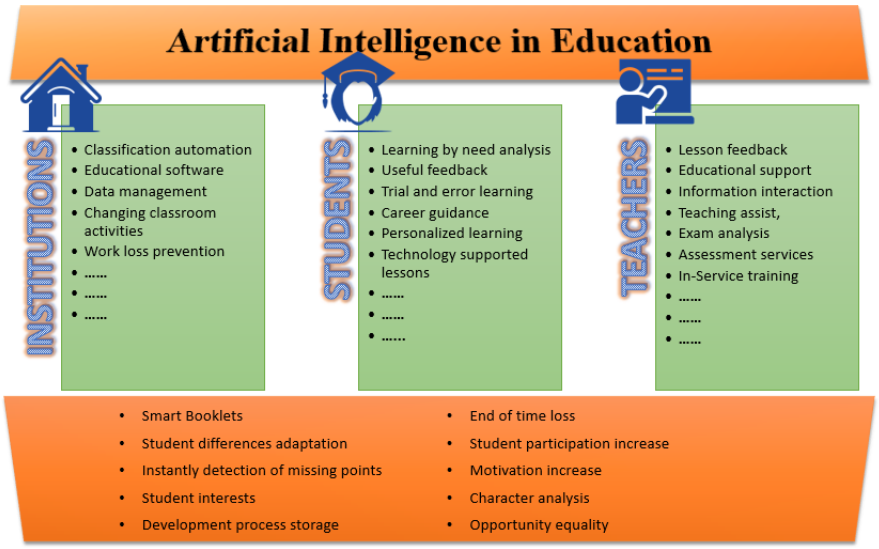

Figure 2. The benefits and possibilities of implementing AI in education

4. AI Application Steps of COMSATS University Islamabad in Education

Improving a nation's development and educational standards requires the quick integration of technological advancements, especially artificial intelligence (AI), into educational systems. Since the 2000s, artificial intelligence (AI) has revolutionized a number of industries. In order to incorporate AI into the nation's educational system, COMSATS University Islamabad (CUI) has proactively adopted research-driven programs, strategic planning, and partnerships.

4.1 COMSATS AI Integration Vision and National Collaboration. The role of COMSATS University Islamabad (CUI) in incorporating artificial intelligence (AI) into Pakistan's technical and educational environment has evolved considerably. In line with national programs like the "Prime Minister's Youth Skill Development Program" and the Organization of Federal Education and Skilled Training "High Impact IT Training" project, CUI has played a key role in faculty training, the development of AI-driven learning platforms, and the establishment of a centralized Educational Data Warehouse. The university emphasizes the use of AI and learning analytics approaches to assess students' academic progress in addition to behavioral and aptitude data. A dedicated research team at CUI supports AI-based performance evaluation systems to improve educational efficacy and reduce administrative expenses. CUI leads efforts to collect, assess, and share scientific data in collaboration with academic institutions and national R&D agencies in order to inform AI policy in education.

The AI Innovator's Bootcamp, a 16-week intensive program that aims to give participants practical skills in Python programming, machine learning algorithms, deep learning, natural language processing, computer vision, data preprocessing, and model deployment, was introduced by CUI in 2024 as part of its expansion of its AI initiatives. This bootcamp aims to equip participants for work in artificial intelligence by providing them with hands-on experience with real-world applications. The Department of Computer Science at CUI also offers a comprehensive Bachelor of Science in Artificial Intelligence degree. With a focus on ethical and responsible AI techniques, it covers foundational subjects like machine learning, robotics, deep learning, and natural language processing. These programs seek to produce graduates who can contribute significantly to a variety of industries, including healthcare, finance, and education, by developing and implementing AI-based solutions.

4.2 “AI Applications in Education" Collaboration Procedure with COMSATS University Islamabad. In order to apply cutting-edge AI solutions in education, COMSATS University

Islamabad and the Organization of Federal Education and Skilled Training formally partnered in 2024 [31]. This collaboration aims to provide individualized learning materials, AI-powered adaptive learning platforms, and intelligent career planning advice tools for students. A three-stage roadmap is outlined in the protocol:

- Identifying future-ready AI competencies and updating technical and vocational curricula to meet market demands.
- Creating personalized learning materials and incorporating AI into national education data systems.
- Training educators and students on risk management, data privacy, and AI ethics. These programs demonstrate CUI's leadership in AI education and commitment to preparing the next generation with the fundamental knowledge and abilities needed to use AI.

4.3 COMSATS AI Strategy and Policy Alignment. With a focus on capacity building, ethical AI use, and global competitiveness, COMSATS University Islamabad (CUI) has strategically matched its institutional growth strategy with Pakistan's National Artificial Intelligence Policy. The university's internal AI plan (2020–2040) aims to develop human-centered AI expertise and establish itself as a national leader in AI education. To do this, CUI is investing in faculty training, curriculum development, and cross-disciplinary research. The proposal highlights the importance of training educators who can implement AI-integrated teaching methods and support long-term policy goals at the federal level [32].

CUI formed a coalition with top universities like NUST, UET Lahore, UET Peshawar, NED University, and Punjab University to create a Rs. 1 billion AI initiative in support of this aim. With an emphasis on fields like robotics, cybersecurity, big data, and AI-driven applications, this partnership seeks to construct nine cutting-edge laboratories in Islamabad, Lahore, Peshawar, and Karachi. Additionally, the Department of Computer Science at CUI provides a thorough Bachelor of Science in Artificial Intelligence degree that emphasizes moral and responsible AI practices while covering fundamental areas including machine learning, robotics, deep learning, and natural language processing. These programs establish COMSATS University Islamabad as a key factor in the advancement of AI education and are in line with government plans to develop a workforce that is skilled in AI technologies and ready for the future.

4.4 AI-Themed Robotics and Innovation Competitions. COMSATS University Islamabad has arranged and hosted several national robotics and AI competitions in keeping with its goal of educating people about AI. These gatherings, which frequently center on real-world AI applications, give teachers and students hands-on experience putting AI-driven ideas into practice. AI-focused research symposiums, capstone projects, and hackathons are some of the ways the university promotes student-led innovation. In this way, CUI promotes a culture of experimentation and practical learning, converting theoretical understanding of AI into useful applications in smart systems, healthcare, and education. In addition to improving AI literacy, these programs bolster Pakistan's ability to take the lead in implementing AI in education [33].

5. Conclusion

Studies on AI have been conducted for 70 years, and they have accelerated dramatically, particularly in the 2000s. Every discipline is at work. using artificial intelligence (AI) technology and are now being used practically in every aspect of daily life. AI technologies are now used in every business, including manufacturing, services, finance, sports, industry, and the automotive sector, making it impossible for educational technology to ignore them.

Everything from teaching strategies and tactics to valuation and calculation services to career counseling, the application of AI technologies in education is evident in every facet of the field. As technology advances and the world changes, so do the types of instructional activities that can be used and their diversity. Teachers' teaching methods should adapt to the changing learning styles of their students.

The digital skills of those who will utilize these applications or supply data here, as well as the computer scientists who have installed this program in the applications' background. Teachers in particular must employ useful AI tools in the classroom, supply data, and decipher the analysis and comments derived from this data. Thus, those in charge of making decisions and establishing policies on the administration of training and education initiatives ought to go in this direction.

Given that AI systems will use teachers' perspectives while evaluating students, the data that must be input into the system by teachers may present a variety of issues. Teachers' digital competencies are the first of these issues. A teacher must use the system and adapt in order to enter data accurately. They also need to have faith in the system's output. The majority of educators in the educational system are members of the X and Y generations. These educators also referred to as digital immigrants later incorporated digital technologies into their daily lives [34, 35]. As a result, not all educators are equally proficient with digital tools. The digital skills of educators, who are among the most crucial players to consider when deciding on AI methods, data into this system, should also be considered and backed up by in-service training components. Data entry by teachers without reliable and comprehensive student information would be another issue. To solve this issue, schools can establish commissions. They can contribute to the system by coming up with ideas using techniques like brainstorming, discussion, and critical thinking, in addition to the viewpoints of the student's tutorial room teachers, councils comprising school analysts, other teachers enrolled in the student's course, and even the class managers.

It has been noted that certain websites that use these programs to conduct educational activities under commercial terms do so. To move solidly into the future, national education strategies shouldn't ignore new technologies. Each nation's individual citizens' educational records are kept by the Treasury. The destiny of the nations will be determined by educational initiatives that address contemporary requirements.

Turkey has made great strides in innovation, and all of the forward-thinking initiatives are for it. In roughly ten years, the effects of these actions will start to become apparent. The benefits of these activities to the nation will start to show themselves when they are carried out with tenacity and resolve. These systems' follow-up throughout the preschool and first grade years and into formal schooling will result in the development of people who are content with the nation's labor and social life due to their skills, interests, and desires.

A challenge that will come up with these systems' adaptation to schooling must be discussed in the study's final section. whether or not parents will take AI systems' recommendations into account, particularly when it comes to job counseling. A methodical investigation is necessary in this case. The public must be adequately informed about this integration. Both public service announcements and school-sponsored promotional guidance initiatives should boost parents' trust in the system. Here, I suggest that the recommendation systems made with a potential AI career guidance, the positive or negative perspectives of the parents, be investigated as a future research topic, particularly for those who will pursue graduate studies in educational management and supervision. These parental preparation levels should be taken into consideration when the Ministry prepares its policies, and the appropriate actions should be implemented.

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