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EDUCATION SYSTEM AND ARTIFICIAL INTELLIGENCE FOR INTERPOSITION

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ABSTRACT :

Artificial intelligence (AI) can be utilized in numerous aspects of education systems. For instance, grading schoolwork and tests can be monotonous and time-consuming, often taking up valuable time that educators could use to interact with students, prepare for classes, or work on professional development. AI can automate grading for various types of assessments, such as multiple-choice and fill-in-the-blank tests. Additionally, AI can identify areas where online courses need improvement; if many students provide incorrect answers to a homework task, the system alerts the instructor and offers future students a modified message with hints toward the correct answer.

KEYWORDS : *Education, AI in Education, Recent technology in Education.*

INTRODUCTION :

AI interventions have expanded significantly across sectors such as e-commerce, healthcare, and education. Artificial Intelligence, defined as the ability of a machine to simulate human intelligence, utilizes machine learning to enhance products based on previous user interactions. This same technology can track student performance by analyzing grades, participation, and overall achievements, thereby helping improve decision-making and information-gathering processes in education.

For instance, the government of Andhra Pradesh conducted an experiment in 17 districts, including Visakhapatnam, using an app powered by machine learning technology. This app collects and analyzes student data, including academic performance, reasons for dropout, quality of education, teacher skills, social demographics, and gender. The analysis provided insights into patterns among potential dropouts. For the 2016-2017 academic year, the national government received a list identifying hundreds of thousands of students at risk of dropping out based on this data.

Such assessments demonstrate how AI can contribute significantly to educational planning and help institutions make better decisions. Leveraging AI on a large scale can address many problems in the current education system. The rapid advancement of technologies, such as artificial intelligence and robotics, has impacted all industries, including education. Contrary to fears of robots replacing teachers, AI programs can assist in teaching subjects like math, while the transmission of complex social and emotional skills remains a uniquely human domain.

India faces a significant shortage of quality teachers, a problem frequently highlighted in mainstream media, which notes that many students are denied a good education. AI can be a solution to this issue due to its adaptability to individual student learning and grasping abilities. Even with the best efforts, a single teacher per classroom often cannot meet the needs of all 60 students. Empowering students with AI systems in schools, smart classrooms, or at home can address the issues of quality and accessibility simultaneously.

Teachers are burdened with multitasking responsibilities, such as evaluating, grading, setting question papers, preparing mark sheets, and monitoring student performance. If AI systems can simplify these tasks, teachers can focus more on course development, teaching quality, and skill development. AI can automate and intelligently manage these administrative tasks, allowing teachers to concentrate on students.

AI-enabled programs will make global classes more accessible, empowering both students and teachers to improve their skills. These programs can serve as the foundation for home education in the 'new normal' post-COVID-19. Students in the remotest parts of India will be able to receive an education comparable to that in urban areas.

One such technology is remote proctoring, which simplifies the process of monitoring exams. Students can take tests from any local or home classroom, with the system enabling remote proctoring through a webcam attached to a computer program. This technology is increasingly being adopted by educational institutions, corporations, and universities to facilitate remote proctoring.

Additionally, physical answer sheet testing has been one of the most burdensome tasks for universities and educational institutions. The use of remote proctoring technology can alleviate this burden, making the process more efficient and less painful.

CONTEXTUAL

AI systems can also interact with technologies such as expert systems and simulation engines, or perform actions in the physical world. The most significant impact is seen in the education sector, particularly in developing countries where education levels and demographics play a crucial role in economic development and transformation. The global education system is rapidly evolving, with advanced technologies bringing about significant changes. From AI and machine learning to automation and digital production, the learning sector is among the most technologically advanced.

For decades, the impact of AI and technology on people's lives has been anticipated, and now these changes are becoming a reality. In India, the importance of an advanced education system is growing, driven by a large and increasing youth population. As digital data collection methods become more prevalent, it is crucial to ensure adequate funding to support advanced education and teaching.

Although humanoid robots may not replace educators in the next decade, numerous projects are utilizing AI to enhance the learning experience for both students and teachers. The integration of technology with new learning processes has transformed education systems worldwide. China, for example, has made significant investments in its education sector, particularly in post-secondary and automotive fields, aiming for substantial development in these areas.

India, one of the leading developing countries, is embracing new technologies and AI in education. While the adoption of technology in education is improving, it is not progressing at the desired pace. It was estimated that global spending on education technology, or 'EdTech', reached nearly USD 185 billion in 2021, with forecasts predicting a 19% annual increase by 2025. In an effort to modernize their education system, India's Central Board of Secondary Education decided to incorporate artificial intelligence into the student syllabus.

With about one-sixth of the world's population, India is poised to significantly influence the global success of the Sustainable Development Goals (SDGs). By 2030, India will have the largest youth population in the world, necessitating a workforce equipped with modern skills. The 2019-20 SDG Index by Niti Aayog assigned a composite score of 62 points for Quality Education, with only 12 states/UTs scoring above 68 points. Current government spending on education is less than 5% of GDP, and the pupil-teacher ratio in elementary schools stands at 24:1, which is lower than in comparable countries like Brazil and China.

Additionally, with a rapidly growing population and declining resources, meeting the demand for teachers will become increasingly challenging.

A bottom-up approach is needed, with SDGs being implemented at the grassroots level. As we approach the final decade for achieving the UN's goals, it is crucial to monitor progress and assess real-time indicators. The 'Transformation of Aspirational Districts' program has demonstrated how regional monitoring and tracking can foster healthy competition, motivating regions to fulfill their responsibilities. The momentum required to accelerate progress towards these goals can be provided by Artificial Intelligence (AI), which will be a game-changer in turning aspirations into success. The unprecedented availability of data in the world's second most populous country, combined with access to powerful computational resources, positions India to become a major beneficiary of the AI wave.

One of the targets under the Quality Education agenda is to significantly increase the supply of qualified teachers by 2030. While addressing the vast demand-supply gap is challenging, AI can help make existing teachers more efficient. Here are some ways AI can contribute (sdg4education2030.org):

Real-time Text-to-Speech and Text Translation Systems: These technologies can facilitate seamless information dissemination in regional languages, aligning with the Draft of National Education Policy 2019, which promotes mother-tongue learning. These translation programs can be integrated with DIKSHA (Digital Infrastructure for Knowledge Sharing) or e-PATHSHALA, initiatives under Sarva Shiksha Abhiyan. For instance, if an e-PATHSHALA textbook is only available in Hindi, text translation services can make it accessible in other regional languages, thus eliminating language barriers and enhancing teacher interoperability across states.

Biometric Authentication: AI can take over mundane administrative tasks such as attendance. For example, student biometric authentication can be introduced and integrated with UDISE+ (Unified District Information System for Education), one of the largest education information management applications for schools. Biometric attendance records can serve as proxies for educational inclusiveness at district, state, and block levels. These records can be easily tracked to monitor national indicators such as youth and adult participation rates and the proportion of men and women enrolled in higher education, technical, and vocational education. This helps monitor and enhance the quality of education in schools.

Chatbots can revolutionize education in a diverse country like India. Integrated into digital infrastructure or available through IVRS systems, chatbots can be trained on various subjects to answer a significant percentage of student queries immediately, thus reducing the current workload of teachers and allowing them to focus on more creative activities. With rural India's internet users expected to reach 820 million by the end of 2025, mobile access will not be a barrier.

Automated Grading: The Draft National Education Policy 2019 prioritizes online learning, and machine learning (ML) methods such as Natural Language Processing (NLP) can be used for automated grading on platforms like DIKSHA, e-PATHSHALA, and SWAYAM. This includes both objective and subjective questions. AI can also assist in automatic content creation; NLP techniques can summarize vast online resources to create concise content for e-learning websites. The ML-based curriculum will align with nationally defined learning outcomes, and the MHRD's 70-point Performance Grading Index (PGI) will help assess indicators such as the percentage of students achieving minimum proficiency levels.

Personalization: AI can facilitate personalized feedback and recommendations on a large scale through e-learning platforms. Currently, individual attention for each student is not feasible. However, AI-created and graded content can cater to personalized learning styles by identifying students' pain points and providing appropriate recommendations. An AI-enabled educational infrastructure would effectively provide each Indian student with a personalized tutor.

- **Administered Organization Representations to Decrease Dropout Rates:** AI programs can provide personalized responses to help reduce India's dropout rates, which stand at 4% at the primary level and rise to 20% in higher education. As personalized trainers gather data throughout a child's educational journey, ML classification models can predict which children are at risk of dropping out, allowing for the development of appropriate remedial measures. These efforts can increase the higher education

enrollment ratio and ensure that more adults achieve literacy, aligning with SDG objectives (Niti Aayog, 2020).

- **Outline Uncovering to Upsurge Rendezvous:** AI can help eliminate gender inequality in education and include people with disabilities. Technologies like Apple's Siri and Amazon's Alexa allow visually impaired users to participate more fully, and real-time text-to-speech systems enable the mute to engage in active exchanges of information. Supporting inclusive education for Children with Special Needs (CWSN) under the Samagra Shiksha MHRD program, AI can benefit children with autism, Parkinson's disease, or other speech disorders by using ML models to detect speech patterns, correct mispronunciations, and convert them into audio or text.

In addition, certain educational institutions may inadvertently favor certain groups, such as preferring multiple students of the same gender or restricting opportunities for indigenous groups. Machine learning algorithms can help monitor and ensure fair enrollment practices, eliminating such biases. For example, AI systems can assess career option selection criteria to ensure a fair process, promoting integrated education.

RESEARCH OBJECTIVES

The research aims to achieve the following objectives:

1. Investigate the correlation between gender and awareness of Artificial Intelligence intervention in the Indian education sector.
2. Examine the association between gender and the perception regarding the potential disruption caused by AI intervention in the Indian education system.
3. Explore the relationship between gender and the perception that AI intervention will enhance personalization and interactivity within the education system.

RESEARCH METHODOLOGY

This empirical research study adopts a descriptive research design and gathers data from primary sources. The primary data collection method involved conducting an online survey from July 15, April, to April 20, 2023, using a well-structured closed-ended questionnaire comprising 10 items. The Pearson Chi-Square test was employed to analyze various factors outlined in the hypothesis. The sample size consisted of 287 individuals from Northern India, selected through simple random sampling. The sample elements were individuals over 18 years old who had completed basic education in the 10+2+3 format.

DATA ANALYSIS & RESULT

The hypothesis testing process for Hypothesis 1 is outlined as follows:

1. Null Hypothesis (H0): There is an insignificant relationship between gender and awareness of Artificial Intelligence intervention in Education in India.
2. Alternative Hypothesis (H1): There is a significant relationship between gender and awareness of Artificial Intelligence intervention in Education in India.

Gender Cross-tabulation

			Gender		Total
			Female	Male	
VAR00002	Yes	Count	95	120	215
		% within Gender	78.5%	72.3%	74.9%
	No	Count	26	46	72
		% within Gender	21.5%	27.7%	25.1%
Total		Count	121	166	287
		%within Gender	100.0%	100.0%	100.0%

Pearson Chi square value=1.442 p value=0.144

The analysis reveals that 78.5% of females are aware of Artificial Intelligence intervention in Education in India, while 21.5% are unaware. Similarly, 72.3% of males are aware, with 27.7% being unaware of such technologies. The Pearson Chi-square test was conducted to determine if this difference is significant. The calculated value of Pearson Chi-square (1.442) is found to be less than the critical value (3.84) at a 5% level of significance with a degree of freedom V= 1. Therefore, the null hypothesis is accepted, indicating an insignificant relationship between gender and awareness of Artificial Intelligence intervention in Education in India.

Hypothesis H02:

H0: There is an insignificant relationship between gender and the perception that AI Intervention will disrupt the Education System of India.

H2: There is a significant relationship between gender and the perception that AI Intervention will disrupt the Education System of India.

*** Gender Cross-tabulation**

			Gender		Total
			Female	Male	
VAR0 0003	Yes	Count	42	66	108
		% within Gender	34.7%	39.8%	37.6%
	No	Count	79	100	179
		% within Gender	65.3%	60.2%	62.4%
Total		Count	121	166	287
		% within Gender	100.0%	100.0%	100.0%

Pearson Chi square value=0.760 p value=0.227

The analysis illustrates the relationship between people's perception that AI Intervention will disrupt the Education System of India with respect to gender. The table shows that 34.7% of females hold a favorable perception, while 65.3% hold an unfavorable viewpoint. Conversely, 39.8% of males have a positive viewpoint, while 60.2% have an unfavorable viewpoint against the statement. A Chi-square test was conducted to determine if this difference is significant. The calculated value of Pearson Chi-square (0.760) is found to be less than the critical value (3.84) at a 5% level of significance with a degree of freedom V= 1. Therefore, the null hypothesis is accepted, indicating an insignificant relationship between gender and people's perception regarding whether AI Intervention will disrupt the Education System of India.

Hypothesis H03:

H0: There is an insignificant relationship between gender and the perception that AI Intervention will improve the personalization and interactivity.

H3: There is a significant relationship between gender and the perception that AI Intervention will improve the personalization and interactivity.

Gender Cross-tabulation

		Gender		
		Female	Male	Total
Yes	Count	99	149	248
	% within Gender	81.8%	89.8%	86.4%
No	Count	22	17	39
	% within Gender	18.2%	10.2%	13.6%
Total	Count	121	166	287
	% within Gender	100.0%	100.0%	100.0%

Pearson Chi square value=3.88 p value=0.040

The analysis highlights the relationship between people's perception that AI Intervention will improve the personalization and interactivity with respect to gender. According to the table, 81.8% of females hold a positive perception, while 18.2% have an unfavorable perception. In contrast, 89.8% of males hold a positive viewpoint, with 10.2% having an unfavorable viewpoint against the statement. A Chi-square test was conducted to determine if this difference is significant. The calculated value of Pearson Chi-square (3.88) exceeds the critical value (3.84) at a 5% level of significance with a degree of freedom V= 1. Therefore, the null hypothesis is rejected, indicating a significant relationship between gender and the perception that AI Intervention will improve the personalization and interactivity.

CONCLUSION

The research objectives have been revisited to assess whether they have been fulfilled. Regarding the first objective, which aimed to study the relationship between gender and awareness of Artificial Intelligence intervention in Education in India, the findings indicate that awareness about Artificial Intelligence does not differ significantly between genders. Both males and females exhibit similar levels of awareness. For the second objective, which sought to explore the relationship between gender and the perception that AI Intervention will disrupt the Education System of India, the study reveals that gender does not influence people's perception regarding the potential disruption caused by AI intervention. People's inclination against this viewpoint suggests that they view the rise of AI intervention in education as temporary, particularly due to the effects of COVID-19. It is perceived that once the situation stabilizes, the education system will return to its previous state.

Concerning the third objective, which aimed to examine the relationship between gender and the perception that AI Intervention will improve personalization and interactivity, the study demonstrates that there is indeed a significant relationship between gender and this perception. It indicates that individuals' perceptions of AI intervention improving personalization and interactivity vary based on gender, suggesting differing attitudes and viewpoints between males and females on this aspect.

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