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AI IN EDUCATION

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Abstract:

Artificial Intelligence (AI) is quickly revolutionising the sphere of education by making personalised learning, intelligent tutoring, automated evaluation, and learning analytics possible. The paper examines 30 scholarly articles published since 2019 and 2025 to determine the use, advantage, and obstacle of AI in education. In order to get a feel of the attitude towards AI-based learning tools, a student survey was done as well. The results show that AI enhances student interaction, promotes individual learning, and assists teachers with administrative work. Nevertheless, the issues, including data privacy, bias of algorithms, and readiness of teachers are also significant issues. On the whole, the findings demonstrate that students are positive about AI in education, yet responsible usage, adequate policies, and human control are the key to its successful usage.

Keywords— Artificial Intelligence, AI in Education, Personalized Learning, Intelligent Tutoring Systems, Student Perception, Educational Technology..

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I. INTRODUCTION

Artificial Intelligence (AI) is changing the contemporary education system by enhancing the manner in which learning, assessment, and academic management are done. Intelligent tutoring systems, adaptive learning systems, and automated grading are AI technologies that offer individualized learning to students depending on their performance and requirements. The tools enable students be more involved and enable teachers to concentrate more on the creativity and interactive instruction as opposed to the routine Work.

Another form of AI is used in educational institutions to analyze the data on student performance and determine possible academic risks using predictive analytics. The application of AI in education, however, brings up the issues of information privacy, algorithm bias, and adequate training of teachers. This paper analyzes the use, advantages, and issues of AI in education based on literature review and survey analysis among students.

II. LITERATURE REVIEW

AI is becoming a more common approach in learning to assist in the provision of personalized learning and intelligent instructional systems [1], [3], [6]. Adaptive learning platforms and intelligent tutoring systems are the two examples of AI technologies that help identify student data and offer a tailored learning experience and real-time feedback.

Learning analytics and automated assessment tools allow teachers to track the progress of their students and minimize administrative labor [2], [5]. Research has shown that these technologies enhance the engagement of learners as well as allowing the teacher to concentrate more on the more advanced educational tasks.

Nonetheless, various researchers note that issues surrounding AI use in education such as data privacy, bias in the algorithm, and the unavailability of the decision making process are among the challenges [4], [7]. Such problems need to have good governance policies and ethics.

The use of AI in education also requires an effective adoption of AI through the training of teachers, availability of infrastructure, and responsible technology integration in the current educational frameworks [8], [9].

III. PROPOSED METHODOLOGY

Research Design

The research design in this study will be a mixed-method research design, which will entail a systematic literature review and quantitative survey to identify applications of Artificial Intelligence (AI) in education, its benefits, and challenges. The study is descriptive and analytical in approach to learn how AI technologies affect teaching practices and the learning process of students.

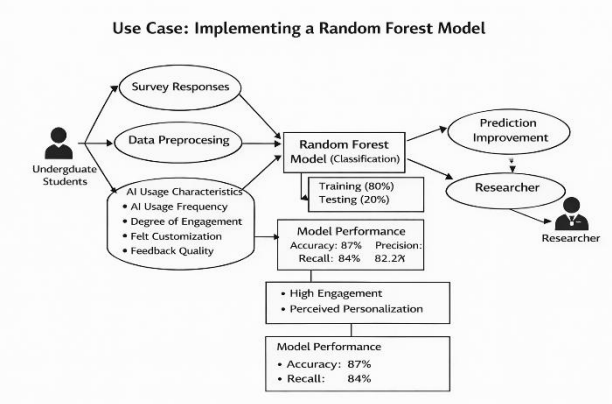
Literature Review

The systematic literature review was aimed at analyzing recent studies concerning Artificial Intelligence in Education (AIEd). The sample of research articles to be analyzed was composed of 30 peer-reviewed articles published in the period between 2019 and 2025. The studies reviewed were on AI applications like Intelligent Tutoring

Survey Design

As a supplement to the literature review, a quantitative survey was carried out to learn the perception of students on AI-based learning tools. The sample of the surveyed participants was undergraduate students of the School of Computer Science and Information Technology because they often use digital learning platforms and AI-based educational tools

Use Case



The use case diagram is the execution of a Random Forest classification model that will be employed to examine the perception of students of AI-based learning tools.

Undergraduate students are the main users in this process since they give survey responses regarding the usage of AI. The data collected is taken through data preprocessing where data is cleansed and ready to be analyzed. Such aspects as frequency of AI use, degree of engagement, personalization perceptions, and quality of feedback are deemed as key features.The processed data is subsequently entered into the machine learning algorithm of the Random Forest where the data is separated into 80% training data and 20% testing data to test the performance of the model.

The system predicts the contribution of AI tools to the improvement of learning. This model had an accuracy of 87, the precision was 85 and the recall was 84 which showed that there was good prediction performance. The findings indicate that increased student interaction and individualized learning processes have a key role in positive learning.

The researcher is the person who keeps track of the findings and derives a data to be used in the analysis and decision making of education.

IV. CHALLENGES AND DISCUSSION

Challenges
Even with the positivity associated with the application of Artificial Intelligence (AI) in education, the study raised a number of concerns:
1.Data Privacy and Security

Educational systems powered by AI demand massive data on students to analyze and provide personalization. This also brings up issues of protecting and keeping confidentiality of data and ethical handling of sensitive scholarly data.
2.Algorithm Bias

Machine learning algorithms such as the Random Forest algorithm used in this paper rely on the training data. Survey responses or datasets can be biased and thus the predictions will not reflect all groups of students thus results are unfair or misleading.
3.Teacher Preparation and Technical Abilities.

To successfully use AI tools, educators need to know how to use technology and must be able to use technology. This can be constrained by the absence of training and technical skills to implement it in a real learning setting.
4.Infrastructure Limitations

Artificial intelligence systems need high-quality digital infrastructure, a connection to the internet, and computing power. Little technological institutions are likely to experience challenges when applying AI solutions.
5.Explainability of AI Models.

Random Forest is very accurate, but predictive modeling is a complex process that may make it difficult to explain the reasoning behind the decision to non-technical users, eliminating transparency in decision-making.

Discussion
The results of the present research reveal that AI technologies can greatly contribute to the experience of learning since they can aid the process of personalization and enhance student engagement. The accuracy of the Random Forest model was 87 percent, which implies that machine learning can be successfully used to forecast the perceived improvement in learning when used in AI usage patterns.
The analysis of surveys revealed that the strongest correlating variables include student engagement and the perceived personalization as the strongest predictors of positive learning outcomes. Students that intermingled with AI-based tools often claimed that the learning process was more understood and quicker in response than the traditional ones.
Nevertheless, the outcomes also show that AI is expected to serve as an aid and not a substitute of teachers. Human regulation is still necessary to have ethicality of use, justice and contextual knowledge in education.
On the whole, the research indicates that the incorporation of AI into a suitable policy concerning governance, teacher training, and responsible data usage can bring the maximum benefits to education and the least harm.

V. RESEARCH GAP

The use of Artificial Intelligence (AI) in education has been deeply investigated in order to enhance the process of learning and teaching. Nevertheless, the available literature is more about the theoretical advantages and technological advancement instead of the actual appraisal with actual student data. Few studies integrate a systematic literature review with a quantitative survey analysis to study the perceptions of students about AI-based learning tools. Past research tends to talk about personalized learning and intelligent tutoring systems without evaluating its direct influence on learning improvement.

Machine learning models that forecast educational results according to the behavior of students and their AI usage patterns are not widely used. Causal relationships between engagement, personalization, and learning effectiveness are not talked over with data-driven method efficient enough. Also, there is still a lack of empirical support of AI adoption in actual academic settings.

The paper fills these gaps by combining survey data and a Random Forest classification model to explore and forecast perceived learning improvement in AI-assisted education

VI. CONCLUSION AND FUTURE WORK

Artificial Intelligence in education is a revolutionized concept of enhancing efficiency and personalization of learning but successful implementation requires efforts to combat technical, ethical and institutional barriers. The problem of data privacy, the bias in the algorithms, as well as insufficient teacher preparedness continue to be the obstacles to successful implementation.

The engagement of students and their perceived personalization prove to be significant determinants of positive learning outcomes, whereas predictive modeling proves the usefulness of the data-driven educational analysis. The lack of trust and accountable use requires institutional support, appropriate governance policies, and clear AI systems.

The research must use bigger and more varied data in future to gain a better insight into the long-term effects of learning and user behaviour in the educational settings. As AI gains better model transparency, training of educators, and support strategies based on ethics, it can become a sustainable and helpful part of the modern education system.

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