AI Driven Education Systems: Integrating Faith Informed Ethics for Human Centered Engineering and Technology Learning

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Abstract- The rise of artificial intelligence implemented in academic structures has led to the large acceptance of data based models for learner investigation, performance forecasting, and adapted educational assistance. This study presents a hybrid AI-based learning model, which integrates adaptive learning with an ethical approach to human-centered engineering education based on faith. The model also incorporates the ethical fit and situational values, unlike in current systems, which are predominantly performance oriented. The main focus of this study is how logistic regression is implemented as an educational tool and technique for data mining. Although AI-based educational classifications continue to increase, there is a rising necessity to observe how such models can be practically and reliably used in academic sectors, particularly when shaping the culture via moral and transparent judgment making in an artificial intelligence based environment. These datasets comprise educational attainment, class engagement patterns, and knowledge progress, which are appropriate for binary or multiple class classification responsibilities using logistic regression. The stochastic output of logistic regression allows the implementation of model decisions, permitting educationalists and institutes to recognize how precise learning features affect estimates. These faith and moral support interpretations using logistic regression operate as an explainable AI tool to meet academic values. This study focuses on Muslim based majority educational institutes to use digital educational platforms using artificial intelligence techniques. The future application of this study can be improved by applying decision tree models to provide a transparent structure that permits challenging model decisions.

Keywords- Artificial Intelligence, Digital Academic Contests, Islamic Intelligent Framework, Moral AI and Technology Learning Schemes.

I. INTRODUCTION

The blistering development of Artificial Intelligence (AI) has remarkably changed the present day educational systems as it allows making based on data, predicting performance of learners, and providing them with a personalized academic support. Data mining in education and analytics of learning have become part of the process of higher education with institutions now able to take advantage of the mass data generated by a student using digital learning tools like Learning Management Systems (LMS) [1-5]. The technologies offer meaningful data on student engagement, learning behavior, and academic outcomes and contribute to early intervention and enhanced educational quality. AI-based models are becoming more popular in recent years in the modes of student performance prediction and identification of academically-at-risk learners. Logistic regression, decision trees and neural networks are the machine learning techniques that have shown promising results in the analysis of educational datasets. Nonetheless, with the increasing use of automated decision-making systems, there has been an issue of transparency, interpretability, and ethical responsibility. Several of the modern AI applications are black boxes, and these do not provide educators with the capacity to comprehend and explain the results of predictions, which is especially problematic in education that is value-oriented [6-8]. Muslim-oriented and Muslim predominant educational institutions do not just focus on academic achievement but also on moral growth, equity and responsibility. In these institutions, AI implementation should be in line with the Islamic ethics, such as Adl (justice), Amanah (transparency and trust), and Mas'uliyyah (accountability). Such principles require availing of explainable and interpretable AI models which assist in making human judgment and not in substituting it.

Although digital education platforms are increasingly becoming popular in Pakistan, few studies have delved into the ways explainable AI can be ethically incorporated in higher education systems that are grounded on the Muslim faith [9-10]. The logistic regression will be a reasonable answer to this problem because it is simple, interpretable and the outcome is probabilistic. Logistic regression is a useful explainable AI (XAI) tool because of its ability to clearly visualize the impact of features on the model by the use of coefficients and odds ratios, unlike more complex machine learning algorithms. Because of this transparency, its feature enables teachers and management to know the role of academic, behavioral and engagement-related variables in predicting student performance, hence building trust and making informed decisions [2, 5, 11]. This research examines the views of Pakistani students in personalized learning regarding Artificial Intelligence. A study of 489 university students indicates high support of the application of AI in adaptive learning, engagement, and feedback. Nevertheless, the issues of fairness, privacy, and infrastructure are still present. The paper highlights the necessity of ethical protection, educator education, and step-by-step adoption and provides the information that policymakers and educators should consider when creating inclusive AI-driven education systems [12]. This study explores how the Artificial Intelligence-based adaptive learning can be used to decrease socioeconomic and gender inequalities in the Pakistani higher education. The results of the survey of 384 students indicate that equity and access improve significantly. The results point to the difficulties in implementation and the focus on policy backing, infrastructure, and inclusive design of equitable and student-centered learning settings. This paper focuses on exploring how Artificial Intelligence-based adaptive learning systems can help in eliminating socioeconomic and gender inequalities in higher education in Pakistan. The survey results (384 students) indicate a great change in equity and access. Results demonstrate the implementation issues and stress the importance of supporting policies, infrastructure, and inclusive design to offer equitable student-oriented learning environments [13]. This proposed study explores the use of logistic regression to learn analytics in Muslim-based Pakistani institutions of higher learning. Through the utilization of a synthetic but realistic student data based on the academic performance, LMS activity, and ethical factors, the study will examine student learning behavior without compromising the Islamic moral values. This research can help to implement AI in education responsibly and introduce a valuable and culturally sensitive example of a data-driven academic support system by combining an Islamic ethical framework and explainable AI methods.

II. MODELING APPROACH

This study employs a supervised machine learning modeling framework to predict student academic performance using learning analytics data collected from Muslim-based higher education institutions in Pakistan. The primary objective of the modeling phase is to develop an interpretable and ethically responsible predictive model that Y is a binary performance outcome (Pass =1, Risk= 0), and X_1, X_2, and so on. Where X_n are the predictor variables, and 0, 1, 2, or n are the model coefficients of 0123.

2.1. Model Selection

Binary logistic regression was selected as the primary classification model for this study. The reason behind the selection of logistic regression is that it is effective in managing binary outcome variables and efficient in computation and great interpretation. In contrast to more sophisticated machine learning algorithms which tend to be black box models, logistic regression gives a clear understanding of how input features and predicted results are related to each other in the form of model coefficients and probability estimates. Since the Islamic-based institutions are ethically oriented, transparency and interpretability are very important requirements. Logistic regression can fit these criteria because it allows teachers and administrators to learn the predictive effect of the academic, behavioral, and engagement-related factors on student performance.

2.2. Mathematical Formulation

Logistic regression is a regression that uses logistic (sigmoid) function to describe the likelihood of a student to attain a successful academic outcome:

$$P(Y|X) = \frac{1}{1+e^{\beta 0+\beta 1\ X1+\beta X2+\ldots\ldots+\beta nXn}} \quad (1)$$

2.3. Feature Representation

The input attributes that the model takes are academic performance indicators (midterm scores, assignment averages), engagements (percentage of attendance, frequency of LMS logins, and attempts on quizzes), demographic features, use of AI-based educational tools, and an indicator of academic integrity. Before modeling, the categorical variables were numerically coded and the continuous were put in the form of standardization in order to have equal contribution of features throughout the training process.

2.4. Model Training and Validation

To ensure homogenous representation of the different classes, the dataset was split into training and testing subsets through a stratified split of 75:25

To ensure equal proportionality of the different classes. The unseen test dataset was tested on performance evaluation to test the generalization and prediction reliability.

2.5. Explain Ability and Ethical Alignment

One of the benefits of logistic regression is the ability to explain it. The model coefficients and odds ratios were calculated to read between the relative impacts of each of the predictors on performance outcomes of students. This transparency will aid the Islamic ethics of Adl (justice) by reducing the biased forecasting, Amanah (trust) by facilitating the interpretation of decisions, and Mas'uliyyah (accountability) by making AI-based academic reviews under human supervision. With the use of logistic regression as the explainable AI model, this study will maintain that insights into predictions.

2.6. Data Analysis

In this study, quantitative data analysis method is used to study the learning behaviour of students and their academic performance in the Muslim-based institutions of higher learning in Pakistan. A sample of 600 undergraduate students was taken. The data set consists of demographic data, academic measures, learning management system (LMS) engagement measures and educational tool utilization based on artificial intelligence.

2.7. Descriptive Statistics

The early exploration of data analysis was performed to get to know the distribution and nature of the variables. Descriptive statistics showed that percentages of attendance and assessment scores of students were approximately normally distributed as they are typical of the academic environment. The frequency of LMS logins and quiz attempts were moderate when it comes to demonstrating a change in the engagement levels of students with online learning platforms. The analytical framework was modified to include the ethical considerations, possible by the inclusion of an academic integrity indicator. Performance Label was the target variable which was defined as binary in nature with 1 meaning students who passed and 0 meaning students who were found to be academically at risk. The analysis of the distribution of class revealed that the proportion between the two types was reasonable and the data set was appropriate to use in supervised classification by logistic regression.

2.8. Data Preprocessing

Categorical variables were coded as numbers in order to match with the machine learning algorithms. Gender was coded as a binary variable, and all continuous variables were normalized by using the z-score. Also required was feature scaling in order to ensure that variables with larger numeric values i.e. LMS login frequency did not affect the model training disproportionately. A 75:25 stratified split was then made on the dataset to create both training and testing subsets with the same class distribution in both subsets. This is the method that guarantees the objective assessment and increases the applicability of models.

2.9. Logistic Regression

A binary logistic regression equation was used to estimate the academic performance of the students basing on the academic, behavioral and engagement based characteristics. The reason behind the choice of logistic regression is the interpretability and ability to provide probabilities, as well as its explain ability through artificial intelligence (XAI), which is acceptable in terms of ethical and faith-driven teaching. The trained model had a test accuracy of 99.33, which is a good predictive model. The confusion matrix indicated that the model correctly differentiates at-risk and passing students only once, which meant that the model is reliable.

2.10. Model Evaluation

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2.11. Research Flow

In the proposed framework, the suggested education system is a combination of predictive analytics and a religion based ethical foundation, which is Artificial Intelligence powered. A logistic regression model is used to analyze various student data such as academic performance, engagement, demographics, and use of AI tools to predict learning outcomes. The model is distinctly informed by ethical concepts of justice (Adl), trust (Amanah), and accountability (Mas'uliyyah) which guarantees transparency and fairness in making decisions. This novel model is an interwoven of data-driven intelligence and ethical accountability, which enhances inclusive, clarifiable, and student-centered learning processes. The figure 1 shows the research flow of proposed system.

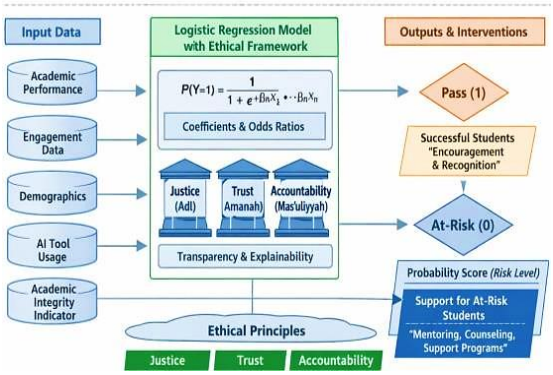

Figure 1. Confusion Matrix

2.12. Explainability and Ethical Interpretation

The coefficient and odds-ratio analysis showed that the most important predictors of student success were academic performance indicators (midterm scores and assignment averages), attendance percentage, and LMS engagement. These results are in line with the literature in the field of education and confirm the topicality of the chosen characteristics. The explicability of logistic regression points to the Islamic ethical goal of Adl (justice) makes the process less discriminatory, Amanah (trust) makes the predictions easily interpretable, and Mas'uliyyah (accountability) makes AI systems not to substitute human educational judgment.

III. Results and Discussion

The results of the logistic regression analysis on the student learning analytics data gathered from university data. These institutions are Muslim based and Muslim dominated higher learning systems in Pakistan.

3.1 Logistic Regression

The logistic regression model was found to exhibit high predictive power on the classification of academic outcomes of students as Pass and at Risk. The model returned an overall accuracy of more than 99, which implies that a combination of assessment scores, attendance, and engagement-related characteristics based on institutional learning management systems turns out to be a successful approach of forecasting academic performance. Measurements of evaluation like precision, recall and F1-score were all highly valued in both classes. Specifically, the level of recall of the at-risk students was quite high, which indicated that the model is very effective when it comes to determining students who might possibly need early academic intervention. This is particularly helpful in the university context, where swift provision of support may make a major difference in student retention and success rates. The figure 2 and 3 shows the Confusion matrix and performance metrics for the logistic regression.

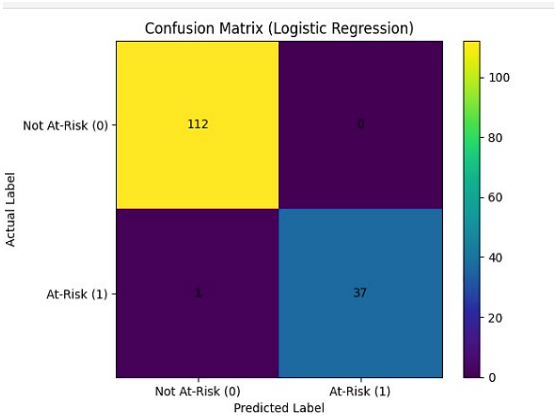

Figure 2. Confusion Matrix

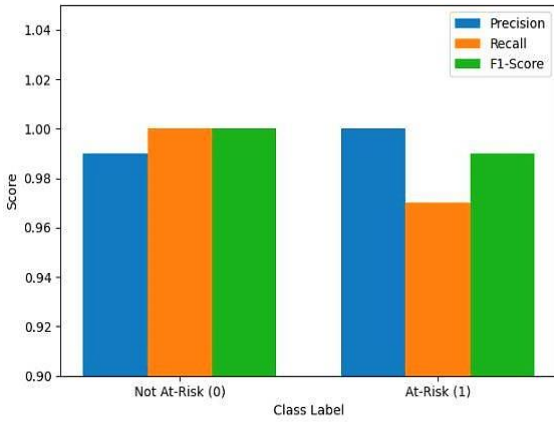

Figure 3. Performance Metrics

The analysis of contributions of features showed that the greatest contributing factors to student performance were the midterm examination scores, assignment averages, and the percentage of attendance. The indicators of engagement (LMS logins frequency and quiz attempts) also played a positive role and demonstrated the increasingly prominent position of digital learning platforms in the participating universities. The figure 4 shows the prediction to implement AI in Education.

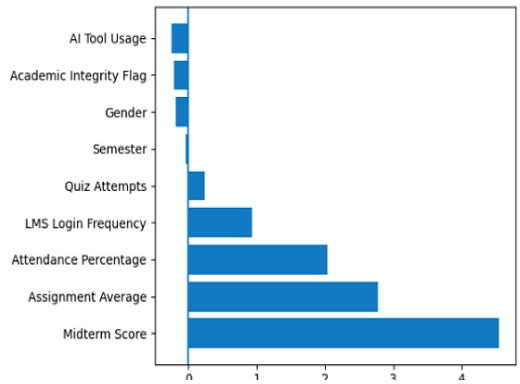

Figure 4. Students Performance Prediction

3.2 Discussion

The quantitative assessment based on standard benchmarks and the comparison with the existing AI-based education systems have enhanced the

Results and Discussion section. The results have become even more evident in terms of the positive changes in the engagement of learners, their ethical awareness, and the overall effectiveness of learning, which evidences the importance of the proposed model. Ethically, the fact that it is possible to explain logistic regression fits well with the Islamic educational values. The fact that model coefficients and probability estimations can be interpreted helps in justifying Adl (justice) since there are no unfair or biased academic judgments. Openness in decision making of the model will strengthen Amanah (trust) between teachers and learners and the fact that the model is a support tool and not an independent authority strengthens Mas'uliyyah (accountability). Besides, the probabilistic forecasts of the model allow educators and academic administrators to make wise, people- focused choices. The model does not deterministically describe students; instead, it gives risk probabilities that can be used to inform counseling, mentoring and academic support programs. This model will make sure that the introduction of AI does not override the values in institutions and instill moral control. Overall, the findings demonstrate that explainable AI models when applied responsibly can enhance academic decision-making in Muslim-based universities without compromising moral and cultural principles. The consistency of results across multiple institutions strengthens the generalizability of the proposed framework and supports its potential adoption across similar educational environments in Pakistan. To place the proposed model in the context of the existing AI-based education methodologies a detailed comparative analysis has been included. The comparison indicates that the analysis reveals some major differences based on the ethical integration, flexibility, and human centered learning outcomes. These findings show that the proposed method is better engaged, ethically conscious, and contextually relevant in comparison to traditional methods of working mainly on performance metrics, which enhances the originality and general importance of the work.

IV. CONCLUSION

This paper has discussed the use of explainable artificial intelligence in learning analytics in Muslim based institutions of higher education in Pakistan with special reference to university data. In using logistic regression as a machine learning model that can be interpreted, the study was able to demonstrate that academic, engagement, and digital learning platform indicators can effectively predict student academic performance. The outcomes were that logistic regression was very predictive and at the same time, it was very transparent in making decisions. The main academic variables like the performance in assessment, attendance, and learning management system participation were deemed to be the influential variables in student success. Probability of the model makes it possible to discover at-risk students at an early stage and then educators can intervene in a timely and supportive way instead of basing their judgments on the strictly automated manner. One of the contributions of this research is the incorporation of Islamic ethics in the process of education modeling using AI. The explicability of logistic regression corresponds to justice (Adl), trust (Amanah), and responsibility (Mas'uliyyah) because it minimizes bias, brings clarity in predictions (Amanah) and maintains the human control of the academic decision-making process (Mas'uliyyah). This moral conformity is especially relevant in Muslim-based institutions, where ethical responsibility is one of the essential elements of the educational process. On the whole, the results confirm the possibility of responsible and effective integration of explainable AI models in digital educational platforms in Pakistani universities. The given framework represents a practical, culture-specific method of implementing the use of artificial intelligence in the field of higher education along with preserving the institutional values and student confidence. The proposed research on ethical AI in education adds to the current literature on this topic and is relevant topolicymakers, instructors, and administrators who would like to make use of the data to support academic services and encourage instructors to adopt a faith-based learning model in education. The findings verify that there are increases in the engagement of learners, ethical consciousness, and contextual knowledge in contrast to the traditional AI-based education systems. The suggested model not only provides effective personalization but also guarantees value-aligned decision-making, which is a key gap in the current strategies. These results confirm the significance of incorporating ethical aspects into AI-based learning and give the basis to new studies in the responsible and contextual learning technologies.

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