

Implement Software Solutions to Reduce Student Dropout Rates at Various Educational Stages

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ABSTRACT- *This project presents an Implement software solutions to reduces student drop rates at various eductional stages. Student dropout poses a major challenge for educational institutions, negatively impacting academic performance, graduation rates, and overall institutional development. Identifying students at risk of dropping out early allows for timely support and helps boost retention rates. This paper introduces an intelligent software solution that leverages machine learning to predict the likelihood of students dropping out. The proposed system is built with Python and the Flask framework, featuring a web interface crafted using HTML, CSS, and Bootstrap to ensure user-friendly operation. Historical student data including academic, demographic, and financial characteristics is preprocessed and then used to train*

classification models such as Decision Tree, Logistic Regression, and Random Forest. The system assesses the performance of these algorithms and picks the model that performs best in predicting whether a student is likely to graduate, stay enrolled, or drop out. The prediction is shown alongside a confidence score and relevant recommendations, helping educational institutions offer academic counseling, mentoring, and financial aid to students flagged as being at risk.

KEYWORDS- *Student Dropout Prediction, Machine Learning, Educational Data Mining, Random Forest, Flask, Python, Student Retention, Predictive Analytics.*

INTRODUCTION

Student dropout has become one of the biggest issues for schools all around the world. A lot of

students drop out of school because they're not doing well in school, they're poor, they have personal problems, and they don't feel like studying. That's why it's important to identify early dropouts so that you can help them. This paper introduces "Software Implementation for Students Dropout at Any Educational Stage," an intelligent online application based on machine learning to predict student dropout. The system uses Decision Tree, Logistic Regression, and Random Forest algorithms to analyze the history of students and predict which ones will continue their education or drop out. According to the prediction results, the system suggests recommendations to help schools take appropriate action.

Built with Python and Flask, and easy to use. We solve problems by using data, we save ourselves from working, and we help students succeed and succeed.

LITERATURE SURVEY

Both students and institutional performance are impacted by student dropout, which has grown to be a major problem for educational institutions. By examining academic, demographic, and economical variables, numerous academics have investigated the use

of machine learning algorithms to forecast students who are at risk of dropping out. According to studies, early prediction enables schools to offer prompt assistance, counseling, and intervention, which can enhance academic achievement and student retention. Recent developments in educational data mining and predictive analytics have improved the accuracy and efficiency of student dropout prediction, empowering educational institutions to improve overall quality and make well-informed decisions.

RELATED WORK

Several researchers have worked on developing student dropout prediction systems to help educational institutions identify students who are at risk of leaving their studies.

Earlier approaches mainly used statistical analysis and simple classification methods based on academic performance and attendance records. Although these methods provided useful insights, they were limited in handling large and complex educational datasets.

Recent research has focused on machine learning techniques, which improve prediction

accuracy by analyzing multiple factors such as academic, demographic, and financial information. These intelliges systems support early intervention and help institutions improve student retention and academic success.

EXISTING SYSTEM

In order to identify students who are at danger of dropping out, the current approaches for predicting student dropout mostly rely on manual monitoring, academic records, attendance, and faculty observations. Early intervention is challenging because educational institutions frequently only examine student performance after negative outcomes are noticed. These conventional methods take a lot of time, are inaccurate, and cannot effectively handle massive amounts of student data. Many at-risk students might not receive prompt assistance as a result, which would raise dropout rates and lower academic achievement

PROPOSED SYSTEM

The suggested approach uses machine learning to forecast the likelihood that students will

drop out at different phases of their study. In order to identify students who are at danger of dropping out, it analyzes student data, including academic achievement, demographic information, financial position, and semester results. To produce precise predictions, the system employs machine learning methods such as Random Forest, Decision Tree, and Logistic Regression. It offers appropriate recommendations that assist educational institutions in implementing timely intervention measures based on the forecast results.

SYSTEM ARCHITECTURE

The architecture of the proposed student dropout prediction system consists of a student dataset, data preprocessing module, machine learning model, prediction module, and web application interface. The system first collects student information such as academic performance, demographic details, and financial status, which is then preprocessed before being given to the machine learning model. The trained model analyzes the input data and predicts whether a student is likely to Graduate, remain Enrolled, or Dropout. The prediction results, along with confidence

scores and recommendations, are displayed through a user-friendly Flask-based web applications

preprocessed before being used to train machine learning models.

The trained model analyzes the input data and predicts whether a student is likely to Graduate, remain Enrolled, or Dropout. The prediction results, along with confidence scores and recommendations, are displayed through a user-friendly web application, helping educational institutions take timely action to improve student retention

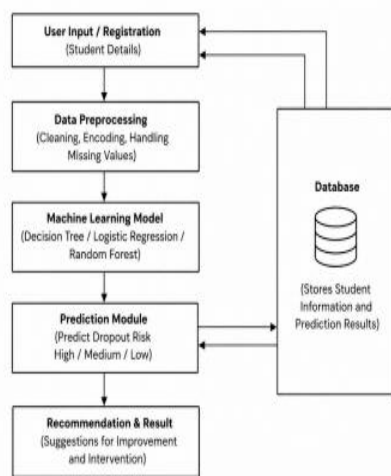


Fig 1: System Architecture

METHODOLOGY

The methodology of the proposed student dropout prediction system is designed to identify students who are at risk of dropping out using machine learning techniques. The system follows a structured process that includes student data collection, data preprocessing, model training, prediction, and result generation. Student information such as academic performance, demographic details, and financial factors is collected and

RESULTS AND DISCUSSION

The Login Page allows authorized users to access the Student Dropout Prediction System by entering a valid username and password.

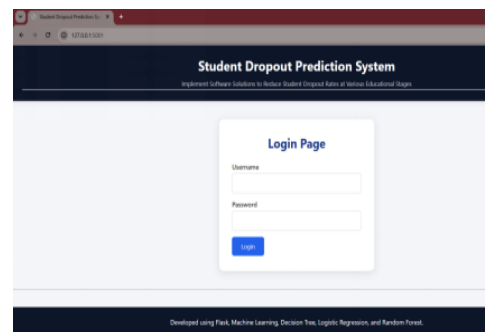


Fig 2: Login page of Student Dropout

The Home Page provides an overview of the Student Dropout Prediction System, including project information and the machine learning algorithms used.

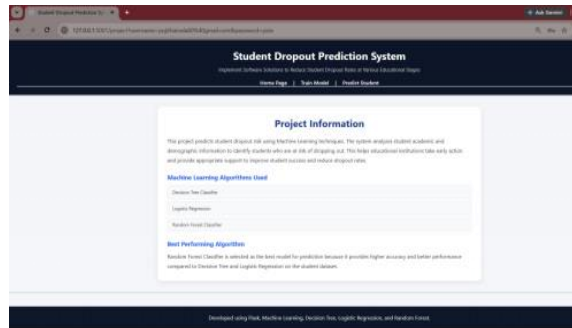


Fig 3: Home Page

TRAIN MODEL

The Train Model page displays the accuracy of the implemented machine learning algorithms, including Decision Tree, Logistic Regression, and Random Forest. We are taking the random forest to execution to execute the student dropout rates at various states.

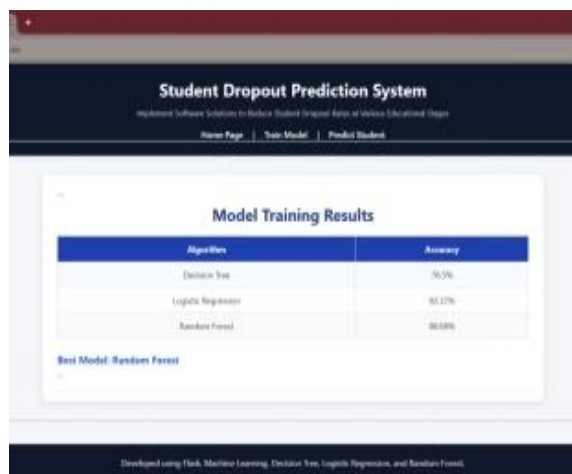


Fig 4: Train Model

STUDENT PREDICTION PAGE

The Prediction Page allows users to enter student details such as age, gender, scholarship status, academic grades, and semester performance.

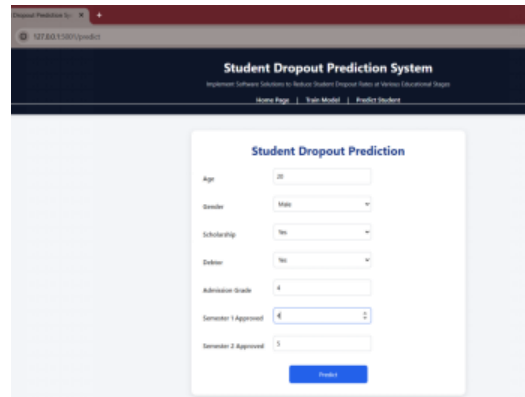


Fig 5: Student Prediction page

PREDICTION RESULT PAGE

The Result Page displays the predicted student status, confidence score, and the input details provided by the user. To predict the result of the student.

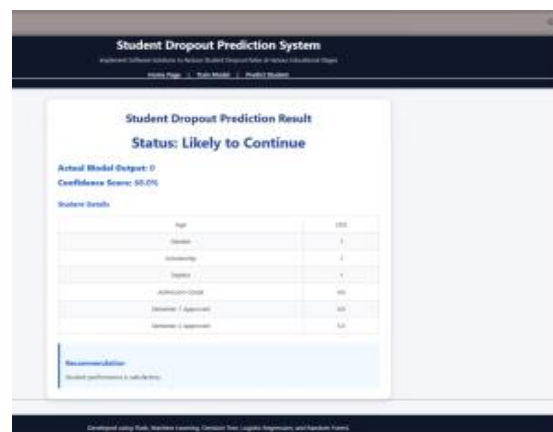


Fig 6: PREDICTION RESULT

CONCLUSION

The proposed software solution improves the process of identifying students who are likely to drop out by using machine learning techniques. By providing early predictions and useful recommendations, the system enables educational institutions to take timely action, reduce dropout rates, and create a better learning environment for students.

FUTURE SCOPE

The proposed student dropout prediction system can be further enhanced by integrating advanced deep learning and artificial intelligence techniques to improve prediction accuracy. To create more thorough forecasts, additional student-related variables including attendance, extracurricular activities, psychiatric evaluations, and socioeconomic status might be included. To enable real-time student performance tracking, the system can be expanded with mobile apps and cloud-based storage. Automatic data collection and ongoing student tracking can be supported through integration with college administration portals and learning

management systems (LMS). Additionally, teachers, parents, and counselors can be informed about at-risk pupils by automatic email or SMS notifications, allowing for prompt intervention and raising student retention rates.

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