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Research Article

FORCASTING ACADMIC PERFORMANCE IN COMPUTER SCIENCE STUDENTS BASEDON FUTURE ANALYSIS METHOD

Mr N.KISHORE KUMAR[1], LINGINENI BHAVANA KRANTHI[2], BINABOINA GNANA HARSHITHA[3], BELLAM HARI KRISHNA[4], NALAMOLU VENKATA KRISHNAKANTH[5]

[1]Department of CSE & AI, Chalapathi Institute Of Engineering And Technology, LAM, Guntur, Andhra Pradesh, India.
[2]Department of CSE & AI, Chalapathi Institute Of Engineering And Technology, LAM, Guntur, Andhra Pradesh, India.
[3]Department of CSE & AI, Chalapathi Institute Of Engineering And Technology, LAM, Guntur, Andhra Pradesh, India.
[4]Department of CSE & AI, Chalapathi Institute Of Engineering And Technology, LAM, Guntur, Andhra Pradesh, India.
[5]Department of CSE & AI, Chalapathi Institute Of Engineering And Technology, LAM, Guntur, Andhra Pradesh, India.

Abstract: The ever increasing importance of education has drivenresearchers and educators to seek innovative methods forenhancing student performance and understanding the factorsthat contribute to academic success. This paper presents a methodology for predicting CGPA SGPA that leverages machine learning techniques to forecast students'academic achievements based on a variety of features, such asdemographic information, academic history, and behavioural patterns. The proposed students academic performance method utilizes a real-world collected dataset from multiple educational institutions toensure an accurate and comprehensive analysis. The proposed methodology starts with a data preparationstage, where the data is cleansed and organized for analysis. This process encompasses tasks such as handling missing values, scaling the data, and transforming variables ifnecessary. The feature analysis technique was used to select the most important features for the students academic performance model. A number ofmachine learning classifiers were tested, and the feature analysis was found to be the best performer. The results of this study demonstrate the potential of algorithms in predicting student performance andidentifying key factors that influence academic success. This information can be leveraged by educators and academicinstitutions to develop targeted intervention strategies, tailoredlearning experiences, and personalized recommendations forstudents, ultimately fostering a more effective learningenvironment and improving overall educational outcomes.
Keywords: Student Performance, Student Performance Prediction, Academic Performance, Prediction System , Student Profiles, Higher Academic Performance, feature analysis.

1. INTRODUCTION

In the current age of big data and advanced computing, machine learning (ML) has rapidly gained traction in variousfields due to its potent predictive and analytic capabilities. The educational sector is no exception, with recent yearswitnessing the integration of ML into diverse educationalprocesses. One emerging application of this technology is theprediction of student performance metrics, such as CGPA SGPA, leveraging historical academic records anddiverse data points. This research paper presents a studyon predicting student semester CGPA SGPA using machine learning algorithms. The primary objective of this study is to build a predictivemodel for student academic performance, specifically semester CGPA SGPA, using a broad range of student data. Such dataencompasses demographic information, previous academic records, attendance, behavioural patterns, and other pertinentdata. The model predicted individual student CGPA SGPA, providing valuable insights into students who may need additionalsupport or those who are likely to excel.

This predictive endeavour proactively identifies student's atrisk of underperformance or failure, enabling educator's andadministrators to intervene promptly and efficiently. Thispredictive model empowers stakeholders to make informed,data-driven decisions regarding additional support andresources to ensure students' success [4,5].The proposed system, termed the semester CGPA SGPA prediction system leverages a suite of supervised machinelearning algorithms, including support vector machine(SVM), linear regression, and Gradient Boosted (GB).These algorithms form the foundation of our predictivemodels, built on a comprehensive dataset collated frommultiple educational institutions. The dataset representsvarious student backgrounds and academic disciplines, ensuring the model's general applicability and robustness.

To enhance the performance of the machine learningmodels, several feature selection and data pre-processing techniques were employed. These include testing datasets fornull value, data encoding for non-numeric features, and datanormalization methods, which streamline the input data and enable the feature analysis algorithms to uncover predictive patterns.

2. LITERATURE REVIEW

An computerized assessment machine has been proposed to assess scholar overall performance and to investigate the scholar achievement. Here the writer makes use of tree set of rules for predicting scholar overall performance accurately. In the proposed machine Education Data Mining (EDM) is used for the type. Clustering facts mining

method is used for studying the huge set of scholar database. This method will accelerate the looking technique and the additionally yield the type end result extra accurately[1].

M.Ramaswami and R.Bhaskaran have used CHAID prediction version to investigate the interrelation among variables which can be used to are expecting the final results of the overall performance at better secondary faculty schooling. The functions like medium of instruction, marks received in secondary schooling, place of faculty, dwelling region and form of secondary schooling had been the most powerful signs for the scholar overall performance in better secondary schooling. The CHAID prediction version of scholar overall performance turned into built with seven magnificence predictor. [2]

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

For your project on predicting student performance using machine learning techniques, the existing system or related work could involve a review of prior research, existing models, or traditional methods used in education to assess and predict student performance. You might discuss the limitations of these existing systems and highlight the gap in the literature that your proposed methodology aims to address.
Consider adding a brief section at the beginning of your paper that introduces the current challenges in predicting student performance, the methods or systems traditionally employed, and the need for more accurate and innovative approaches. This will provide context for readers and emphasize the significance of your proposed methodology in advancing the field.

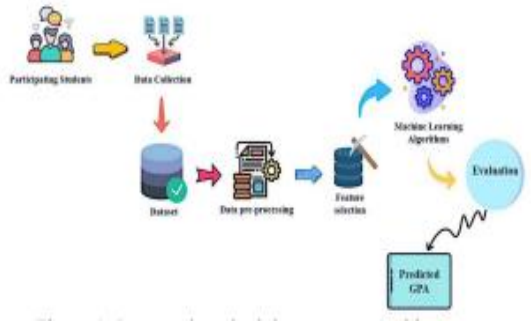
LIMITATIONS OF EXISTING SYSTEM

- **Lack of Personalization:** Many existing systems lack personalized approaches to student performance prediction. They may use generalized models that do not consider individual learning preferences and variations, resulting in less accurate predictions for specific student populations.
- **Limited Integration of Behavioural Data:** Existing systems often underutilize behavioural data in predicting student performance. Factors such as attendance, engagement in extracurricular activities, or study habits are not always integrated into predictive models. Neglecting these behavioural aspects can lead to an incomplete understanding of student performance**.**

3.2 PROPOSED SYSTEM

The proposed system aims to address several limitations inherent in existing approaches to predicting student performance. Leveraging advanced machine learning techniques, our system introduces a more comprehensive and personalized methodology. Unlike traditional systems that rely heavily on academic metrics, our approach considers a broader range of factors, including demographic information, academic history, and behavioural patterns. By employing the Recursive Feature Elimination (RFE) technique, we ensure the selection of the most relevant features for the predictive model, thus enhancing accuracy.
One key innovation of our system lies in its ability to adapt to dynamic changes in a student's academic journey. By incorporating real-time data and adopting the linear regression algorithm as the primary classifier, our system demonstrates a greater capacity to capture sudden shifts in behaviour or personal circumstances. Furthermore, the inclusion of behavioural data, such as attendance and engagement in extracurricular activities, contributes to a more holistic understanding of student performance.
The personalized nature of our methodology addresses the limitations of existing systems that often lack individualization. Recognizing that different students have distinct learning preferences and needs, our system strives to provide tailored predictions, fostering a more accurate representation of academic outcomes. By doing so, we aim to offer educators and academic institutions a valuable tool for developing targeted intervention strategies, personalized learning experiences, and recommendations, ultimately contributing to a more effective and equitable learning environment.

4. SYSTEM ARCHITECTURE



5. MODULES

User: User module facilitates user interactions, handling input, authentication, and personalized experiences, ensuring smooth navigation and seamless engagement within the system.

• **Server: The** server to provide data storage service and can also do the following operations such as View Users, View All Stored Data, View Charts.

• **Output Module:** The output module takes the output from the classification module and presents it in a user friendly format. This module may include a graphical user interface (GUI) that displays the Graphs

• **Evaluation:** Evaluation of the system involves assessing its effectiveness, accuracy, and user satisfaction through testing, feedback collection, and performance analysis to ensure optimal functionality and meet user expectations.

6. RESULT

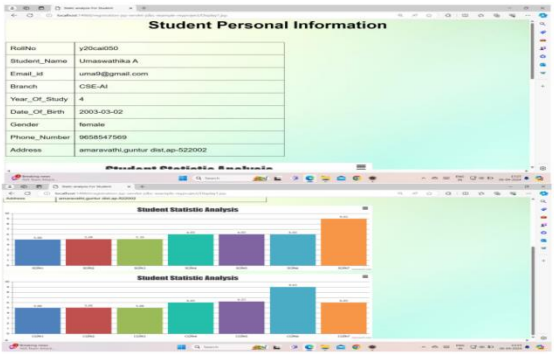


Fig 6.1: Shows personal information and statistic analysis of student CGPA, SPGA

7. CONCLUSION: We propose an automatic age (biological) and gender estimation system for the promising smart store enterprise which is a modern venture in the retail industry. This automated system can extract the human demographics necessary to provide the customer a very good shopping experience that results in a boost of offline smart store sales. In addition, this enterprise solution can ease the shopping process and shorten the shopping time for the consumers. Although recent methods show their potentials for the problem of age and gender estimation, the best works focused on constrained image benchmarks. As a result, these methods are not robust enough for the application involving real-world images. Most recently, some of the researchers learned to apply their model utilizing unconstrained image datasets, but these models are biased for the early and middle adulthood classes due to image sparsity problems in the dataset.

FUTURE SCOPE: While the future scope is promising, it's important to navigate challenges such as data privacy, ethical use of AI, and the potential for algorithmic bias. Ensuring transparency, fairness, and inclusivity in AI and ML applications is crucial to their success in enhancing educational outcomes.

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