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STUDENT ACADEMIC SUCCESS

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Abstract

The prediction of students' academic achievement is crucial for universities to identify students at risk of academic failure. This paper aims to present data mining models using classification methods based on Support Vector Machine (SVM) algorithms to predict students' academic achievement after their preparatory year and to identify the algorithm that yields the best performance. Students' academic achievement is defined as High, Average, or Below Average based on their graduation CGPA. These models are applied to a newly created dataset consisting of 339 students and 15 features from the College of Information Technology (IT).

Keywords: Support Vector Machine (SVM), computer vision, neural network.

I. INTRODUCTION

Predicting student academic performance is essential for enhancing student success in higher education. This project aims to develop a predictive model that assesses student performance based on CGPA, attendance, academic performance, and extracurricular activities[3].

Educational institutions increasingly use data-driven methods to support student development. This study uses data mining techniques to analyze historical data and identify patterns that predict future academic outcomes[2]. By integrating various indicators such as CGPA, attendance records, course performance, and extracurricular involvement, the model provides a comprehensive assessment of a student's academic potential.

The predictive model not only forecasts academic performance but also serves as a proactive tool for educators. Identifying at-risk students early allows for timely interventions like counseling and tutoring, helping to improve their academic standing. The goal is to enhance educational outcomes and support student success through data-informed strategies.

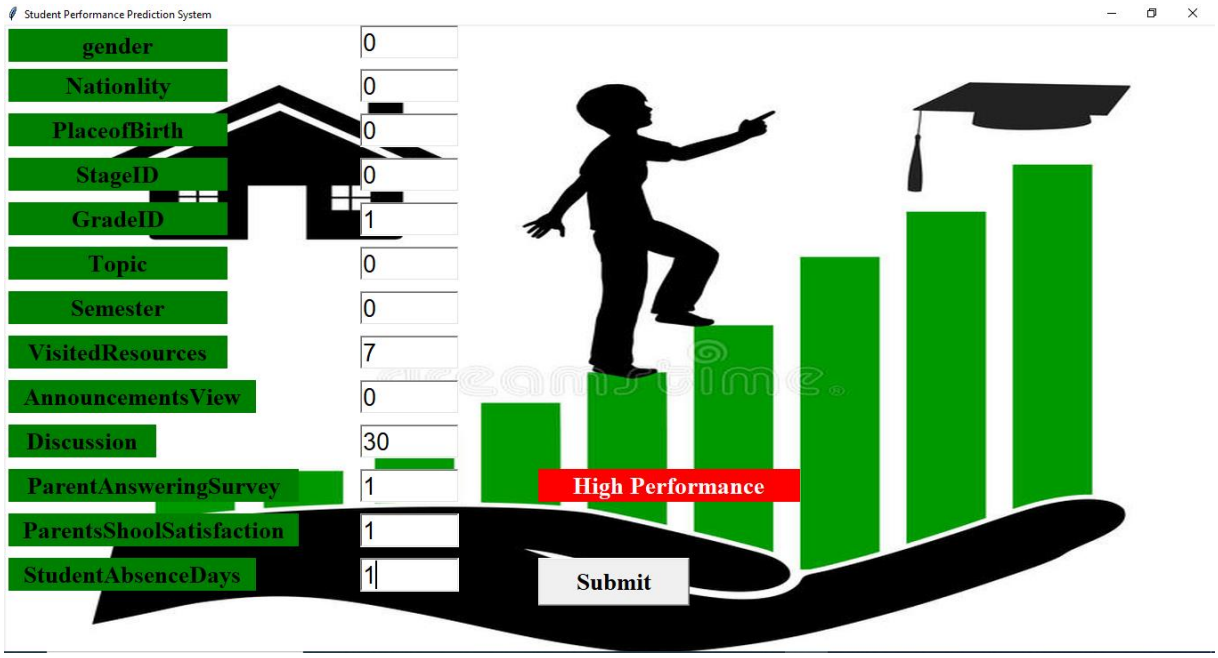

Fig 1: Student perfomance

II. BACKGROUND STUDY

Improving academic achievement is crucial for student success and employability. Research indicates that early performance feedback can significantly enhance student outcomes by identifying and addressing learning gaps promptly. Effective systems for providing such feedback are essential and should be user-friendly and easily accessible to both students and educators.

Additionally, physical activity and sports have been shown to positively impact academic performance. Studies suggest that regular physical exercise can improve cognitive function, concentration, and mental health, all of which contribute to better academic results.

By integrating early performance feedback systems and promoting sports participation, educational institutions can create a more holistic approach to student development, ultimately leading to higher academic achievement and better preparation for future employment.

III. LITERATURE SURVEY

- **Title:** Students Performance Tracking Using BPM Classification Modelling, **Authors:** Praveen Mathai1 and Sreekumar K2 **Abstract:** This study uses educational data mining to predict student performance using questionnaires and teacher input, leveraging Linear Regression and SVM classifiers. The model ensures continuous, accurate academic monitoring.

- **Title:** Improving Learning Experience of Students by Early Prediction of Student Performance Using Machine Learning
  Authors: Hina Gull1, Madeeha Saqib2, Sardar Zafar Iqbal3, Saqib Saeed, **Abstract:** This study uses machine learning to predict student grades, finding Linear Discriminant Analysis most effective with a 90.74% accuracy on historical data from an undergraduate course.

- **Title:** A Robust Performance Degradation Modelling Approach Based on Student's t-HMM and Nuisance Attribute Projection. **Authors:** Huiming Jiang, Jing Yuan, Qian Zhao, Han Yan, Sen Wang, Yunfei Shao **Abstract:** Proposes a robust PDA model using Student's t-HMM and NAP to improve robustness and efficiency, validated with bearing vibration data.

- **Title:** Data Mining Analysis on Student's Academic Performance through Exploration of Student's Background and Social Activities [2020] **Author:** Ching-Chieh Kiu **Abstract:** Utilizes data mining techniques to predict student performance based on background and social activities, showing significant impact on predictions.

- **Title:** Identifying Dominant Characteristics of Students' Cognitive Domain on Clustering-based Classification. **Authors:** Yuni Yamasari Supeno, M. S. Nugroho, Hideya Takahashi, Kayo Yoshimoto, Mauridhi H. Parnomo **Abstract:** Proposes a discretization method and feature selection for optimal student data clustering, improving classification performance.
- **Title:** Educational Data Mining: A Review of Evaluation Process in e-Learning **Authors:** Marcos Wander Rodrigues, Luiz Enrique Zárate, Seiji Isotani **Abstract:** Reviews 20 years of EDM research, focusing on the evaluation of teaching and learning processes, highlighting trends and potential directions.
- **Title:** Information Hiding Scheme for Digital Images Using Difference Expansion and Modulus Function [2018] **Authors:** Pascal Maniriho, Tohari Ahmad **Abstract:** Introduces an improved steganography method using difference expansion and modulus function, increasing embedding capacity by considering both positive and negative values.

IV. METHODOLOGY

4.1 Data Collection: Gather historical academic data, including CGPA and course grades Collect data on student demographics, sports participation, and extracurricular activities.

4.3 Data Preprocessing: Clean and normalize data. Handle missing values and transform categorical data.

4.3 Implementation of Data Mining Techniques: Apply SVM classifiers (J48, RT, and another SVM variant) to predict CGPA. Evaluate classifiers using accuracy, precision, recall, and F1-score.

4.4 Feature Selection: Identify significant features impacting academic achievement (e.g., preparatory year CGPA, Computer Skills, Communication Skills, Mathematics). Use feature importance scores to refine models.

4.5 Development of Early Performance Feedback System: Design a user-friendly system for timely performance feedback and recommendations. Ensure accessibility for students and educators.

4.6 Impact of Sports on Academic Performance: Analyze the correlation between sports participation and academic success. Incorporate sports data into predictive models.

V. ARCHITECTURE

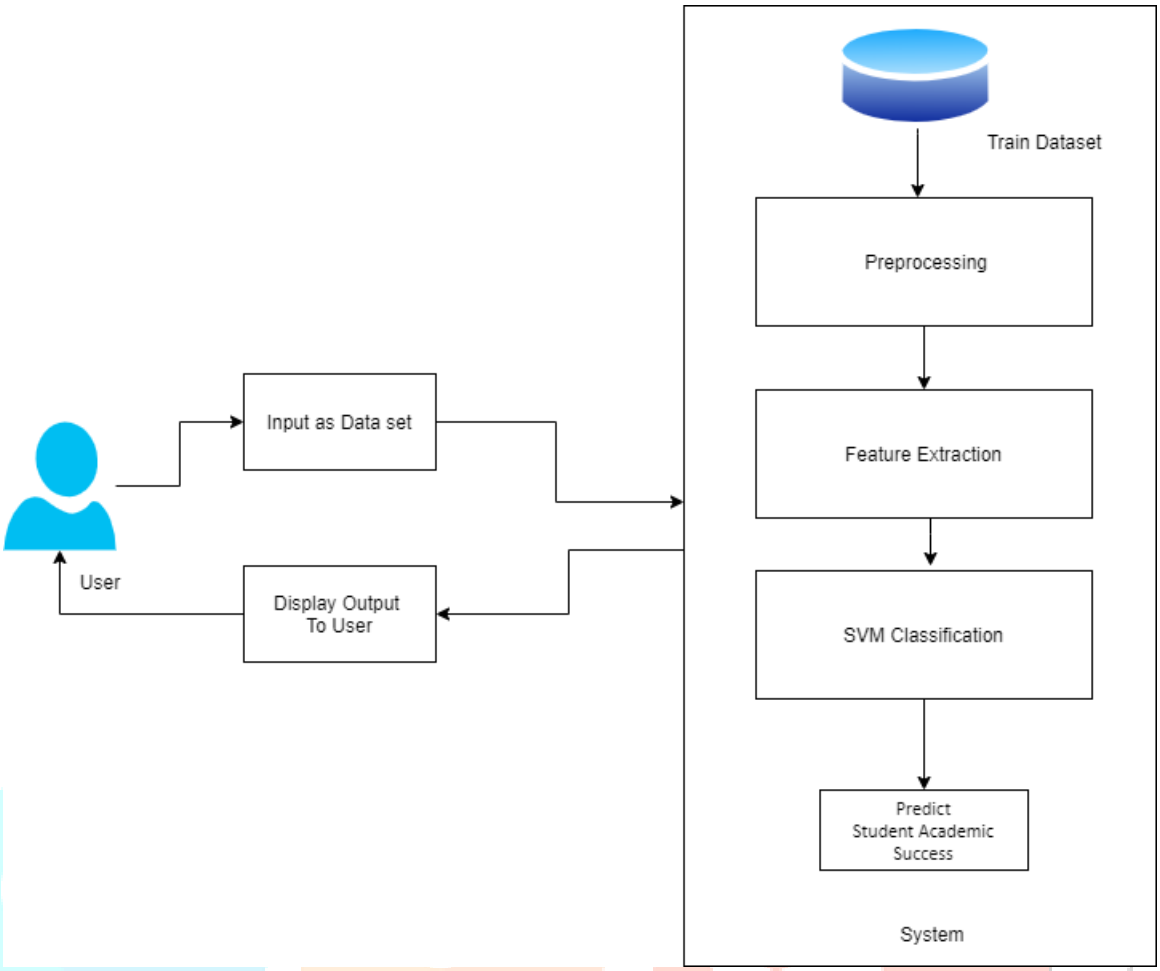

Fig 2: System Architecture

VI. FUTURE SCOPE

The future scope of this topic encompasses various avenues for further exploration and development. Firstly, there's a need to refine the proposed system to provide early performance feedback. This refinement process should prioritize usability, personalization, and intervention capabilities to ensure that the feedback system effectively supports students in improving their academic achievement. Additionally, longitudinal studies are essential to track the long-term impact of early feedback on academic performance and employment outcomes. By conducting these studies over multiple semesters, researchers can gain insights into the sustained effectiveness of the feedback system and identify areas for improvement. Moreover, researchers can delve into exploring different intervention strategies to support students with low comprehension levels. These strategies may include personalized tutoring, access to additional study resources, and mentoring programs tailored to individual student needs. Furthermore, investigating the relationship between sports participation and academic success presents an exciting area for future research. Longitudinal studies can help determine how regular physical activity influences cognitive function, academic motivation, and overall student success, potentially leading to the integration of sports programs into the academic curriculum. Lastly, collaborative efforts with other institutions can provide valuable insights through comparative analyses. By sharing best practices and exchanging data, researchers can identify common trends and challenges in addressing low academic achievement and graduate unemployment across different educational settings.

VII. CONCLUSION

This research focused on the predictive ability of data mining (DM) methods in forecasting students' achievement following the preparatory year at the degree level in higher education. The students' achievement was categorized based on the Grade Point Average (CGPA) into high, average, or below average. Throughout the experiment, three SVM classifiers, namely J48 and RT, were implemented on the student dataset to predict the students' achievement upon graduation. The results demonstrated that the J48 classifier outperformed in predicting students' achievement with a reasonable accuracy rate of 69.3 percent. Furthermore, key features that significantly influenced the prediction of

academic achievement for CCSIT students included CGPA for the preparatory year, Computer Skills course, Communication Skills course, and Mathematics course. These findings offer valuable insights into predicting students' final achievement at an early stage, allowing for timely interventions by providing warnings to students. Consequently, effective counseling measures can be implemented to reduce the percentage of students with low achievement.

VIII. ACKNOWLEDGMENT

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IX. REFERENCES

[1] Praveen Mathai1 and Sreekumar K2, "Students Performance Tracking Using BPM Classification Modelling", Department of Computer Science and IT, Amrita School of Arts and Sciences, Kochi, Amrita Viswa Vidyapeetham.

[2] Hina Gull1 , Madeeha Saqib2 , Sardar Zafar Iqbal3 , Saqib Saeed4 "Improving Learning Experience of Students by Early Prediction of Student Performance using Machine Learning", 4Department of Computer Information Systems, College of Computer Science and Information Technology, Imam Abdulrahman Bin Faisal University India. Nov 6-8, 2020

[3] Mohammed Afzal Ahamed, Prayuk Chaisanit and Prof.Mahesh T R," Performance of Student Prediction", "International Journal of Computer Science and Information Technology, Vol 8, Iss 6, June 2019.

[4] University disciplines and the structure of the labor market - Economic newspaper,"2019 .[Online].Available:http://www.aleqt.com/2018/07/16/artic le-1420651.html. [Accessed: 30-Oct-2019]

[5] N. A. Yassein, R. G. M Helali, and S. B. Mohomad, "Predicting Student Academic Performance in KSA using Data Mining Techniques," J. Inf. Technol. Software Engineer , vol. 07, no. 05, 2017.

[6] A. Mueen, B. Zafar, and U. Manzoor, "Modeling and Predicting Student's Academic Success Using Data Mining Techniques," Int. J. Mod. Educ. Computer. Sci., vol. 8, no. 11, pp. 36–42, 2016.

[7] H. Almarabeh, "Analysis of Students' Performance by Using Different Data Mining Classifiers," Int. J. Mod. Educ. Computer. Sci., vol. 9, no. 8, pp. 9– 15, 2017.

[8] M. Al-Saleem, N. Al-Kathiry, S. Al-Osimi, and G. Badr, "Mining Educational Data to Predict Students' Academic Performance," Springer, Cham, 2015, pp. 403–414. [6] R. Asif, A. Merceron, and M. K. Pathan, "Predicting Student Academic Performance at Degree Level: A Case Study," Int. J. Intell. Syst. Appl., vol. 7, no. 1, pp. 49–61, 2015.

[9] Raheela Asif, Saman Hina, Saba Izhar haque, "Predicting Students Academic Performance using data Mining Methods", Vol 17, Iss 5, May 2017

[10] R. Deng, P. Benckendorff, D. Gannaway, Progress and new directions for teaching and learning in MOOCs, Computers & Education, 129,2019, pp.48-60