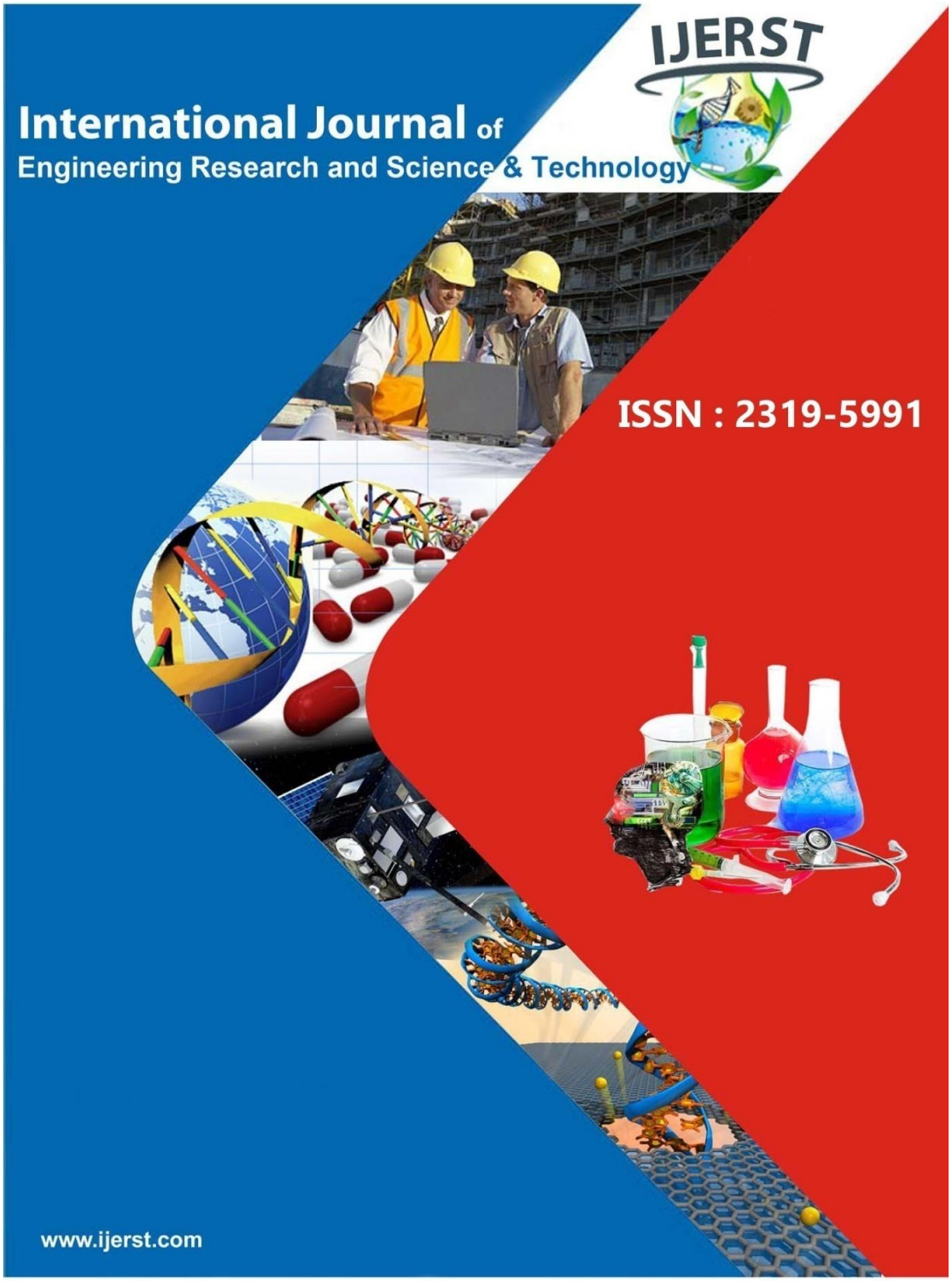

Email: editor@ijerst.com or editor.ijerst@gmail.com

International Journal of Engineering Research and Science & Technology

ISSN 2319-5991 www.ijerst.com

Vol. 21, Issuse.1Jan 2025

TEAM GENERATOR

[1]Dr.U.M.Fernandes Dimlo,[2]Kambhampati Anil Kumar,[3]Mangali Manjunath,[4]Gandla Shiva Sai,

[5]Gandam Yuvaraj

[1]Professor & Head**,**Department Of Computer Science And Engineering,Sreyas Institute Of Engineering And Technology, umfernandesdimlo@sreyas.ac.in

[2,3,4,5]Students,Department Of Computer Science And Engineering,Sreyas Institute Of Engineering And Technology.
[2]kambhampatianilkumar8@gmail.com, [3]manjunathmangali205@gmail.com, [4]g.shivasai05@gmail.com,
[5]yuvarajyadav664@gmail.com.

ABSTRACT

In educational institutions, efficiently organizing students into effective study groups or batches is crucial for academic success and faculty guidance. This project focuses on automating the process of team formation and guide allocation based on student academic records and faculty expertise. Initially, student data, including names, roll numbers, semester-wise marks, and CGPA (if applicable), are extracted from an Excel sheet and stored in a database. For students with pending examinations, the number of backlogs is recorded for subsequent handling. Students who have achieved a CGPA through passing all their examinations are grouped into batches, ensuring equal distribution based on academic performance. Students with backlogs are assigned to separate groups. The next phase involves allocating faculty guides to each batch. Guides are selected based on their qualifications, including designation, experience (minimum 5 years), and domain expertise. Faculty preferences for specific domains are considered to ensure optimal mentorship alignment. Finally, the total number of students is divided into batches of four students each, with the batch count adjusted to accommodate any remaining students in a final batch of appropriate size. This project streamlines the team formation process, enhances academic collaboration, and ensures effective mentorship, thereby improving overall learning outcomes in educational settings.

I.INTRODUCTION

In academic institutions, grouping students effectively into study batches plays a vital

role in fostering collaborative learning environments and optimizing faculty support. The manual processes traditionally used for

forming study groups and assigning faculty mentors often result in inefficiencies, inaccuracies, and inconsistencies. These issues can lead to unbalanced academic performance within groups, misalignment between mentor expertise and student needs, and an overall lack of equitable resource distribution. The increasing size of student populations and the growing complexity of academic requirements necessitate a systematic approach to these tasks. This project introduces an automated solution to address these challenges by using data-driven methodologies to create balanced study groups and allocate faculty guides based on their qualifications and domain expertise. The system is designed to streamline administrative workflows, reduce errors, and ensure fairness in the distribution of students and faculty resources. By automating repetitive tasks and incorporating intelligent algorithms, the proposed solution enables institutions to focus on delivering high-quality education and mentorship. Traditional methods of forming study groups and assigning mentors are inadequate in modern academic settings, primarily due to their reliance on manual processes. These methods are often subjective, time-intensive, and prone to errors. Key challenges include:

•**Uneven Distribution of Students:** Manually forming groups can result in imbalances in academic performance within batches, hindering collaboration and progress.

•**Mismatch of Faculty Expertise:** Faculty mentors may be assigned to groups without consideration of their domain expertise or preferences, leading to suboptimal mentorship experiences.

•**Administrative Overheads:** The manual effort required to gather data, analyze it, and assign groups and mentors is significant, diverting resources from core academic functions.

•**Lack of Adaptability:** Traditional methods struggle to accommodate dynamic changes such as updated academic records, faculty availability, or varying student intake. These issues can negatively impact the learning outcomes of students and the effectiveness of faculty guidance. The proposed automated system addresses these shortcomings by providing a standardized, efficient, and adaptive approach to forming study groups and allocating mentors. The primary goal of

the project is to enhance the efficiency and accuracy of group formation and mentor allocation processes.

II.LITERATURE SURVEY

1.A New Approach to Collaborative Group Formation

This paper implements a tool, referred to as the Automated Group Decomposition Program (AGDP), which divides a class of students into groups, using the k-means algorithm, for the purpose of collaborative learning, and then heterogenizes the groups based on a factor called the degree of heterogeneity (DOH). The tool takes as input two sets of scores and the students‟ roll numbers and outputs the required groups. The first score set scored students on communication skills, fluency in using computers and group work attitude. This score set was used to generate the homogeneous groups. The second score set scored students on their knowledge of the subject and was used to generate the heterogeneous groups. The tool can be used to generate homogeneous clusters, heterogeneous clusters and a mixture of both. This tool can not only be used by teachers but also by instructors with minimal computer experience wishing to form groups to maximize learning. Keywords collaborative learning, k-means, constraint satisfaction, degree of homogeneity, group learning, homogeneous groups, heterogeneous groups.

2. Collaborative Group Formation Using Genetic Algorithms

Collaborative learning is a process in which two or more individuals interact in order to learn or attempt to learn something. The success of the process depends heavily on the way in which the individuals are engaged in a community, i.e. where the process takes place. Individuals in the community are grouped into small clusters that i) posses homogeneous properties and ii) emphasize the diversity inside the group, allowing flourishing of diverse points of view. In this work we focus on the formation of groups of individuals. More specifically, we apply genetic algorithms in the formation process in order to deal with the high level of complexity. We developed a prototype to evaluate the approach and the results are discussed. Keywords. Genetic algorithms, Collaborative learning

3.A Method for Group Formation Using Genetic Algorithm

Due to the increasing of complexity in software projects, group work is becoming more important in order to ensure quality software products can be delivered on time.

Thus, in universities, group work is seen as a good preparation for students to enter industry because by working in group, it can reduce the individual workload, improve the ability to manage a project and enhance the problem solving skills. However, due to lack of programming skills especially in Java programming language, most of the students' software project cannot be delivered successfully. To solve this problem, systematic group formation is one of the initial factors that should be considered to ensure that every group consists of quality individuals who are good in programming. This paper presents a method for group formation using genetic algorithm, where the members for each group will be generated based on the students' programming skill. Keywords-group formation; genetic algorithm; programming skill.

4.Grouping in Collaborative E-Learning Environment

Collaborative learning is an online classroom can take the form of discussion among the whole class or within smaller groups. Moodle (Modular ObjectOriented Dynamic Learning Environment) is a free and open source e-learning software platform, also known as a Learning Management System, or Virtual Learning Environment (VLE). As a web-based tool, Moodle offers the potential to deliver courses which include a huge variety of information sources – links to websites, images, and multimedia – which are difficult to deliver in a traditional teaching environment. The chat activity module in moodle allows participants to have a real-time synchronous discussion in a moodle course. A teacher can organize users into groups within the course or within particular activities. This paper aims in efficient group formation of learners in a collaborative learning environment so that every individual in the group is benefitted. As a testing platform tenth standard Tamil text book is incorporated in to moodle. In this paper K-NN clustering algorithm is used to improve the group performance. This algorithm achieves good performance in terms of balancing the knowledge level among all the students. . Key Words— KNN, Collaborative environment, moodle, elearning, group formation.

III.EXISTING SYSTEM

The current systems used for forming study groups and assigning mentors in academic institutions are predominantly manual or, at best, partially automated, relying on basic tools such as spreadsheets or predefined grouping templates. These systems aim to

organize students into study groups and allocate faculty mentors to provide guidance and support. However, they suffer from several inefficiencies and limitations that hinder their effectiveness in addressing the dynamic needs of educational institutions.

1.Manual Group Formation Systems

Many institutions rely on manual processes where administrators or faculty members review student academic records, sort them into groups, and assign mentors. While straightforward, this approach is time-intensive and prone to biases, errors, and inefficiencies.

2.Learning Management Systems (LMS)

Platforms like Moodle, Blackboard, and Canvas offer basic tools for grouping students within courses. These tools allow instructors to create groups manually or randomly, assign activities, and facilitate collaboration.

3.AI-Based Educational Platforms

Some institutions and startups are experimenting with AI-powered solutions for team formation and mentor assignment. Examples include:

•Peachy Mondays (used in HR settings): Provides AI-driven team and mentor matching based on compatibility scores, which could be adapted for academic purposes.

•EdTech Tools with AI: Platforms like Coursera and Udemy use AI to recommend courses and mentors, showcasing similar technologies that could be applied to team formation in schools.

IV.PROPOSED SYSTEM

This project is an automated solution designed to streamline the process of organizing students into effective study groups and assigning faculty guides in academic institutions. By leveraging automation and data-driven algorithms, the system enhances efficiency, fairness, and academic collaboration. The project primarily focuses on ensuring balanced group formations and optimal mentor assignments, aligning with the students' academic needs and the mentors' expertise.

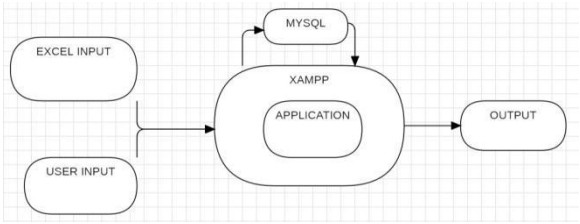

Fig1: Architecture Diagram

V.METHODOLOGY

The implementation methodology for the Team Generator system follows a structured process that ensures efficient student group formation and faculty guide allocation. The first step in the process is data extraction and preprocessing. In this phase, essential student data is extracted from an Excel sheet, including details such as names, roll numbers, semester-wise marks, CGPA, backlog status, and any relevant extracurricular activities. Data validation is then performed to ensure data integrity, checking for missing or incomplete entries. Students with pending examinations have their backlog status recorded. The processed data is then stored in a relational database, such as MySQL or PostgreSQL, where the database tables are designed to accommodate student details, academic performance, and backlog status.Following data extraction, the next phase is batch formation based on academic performance. The student data is queried from the database, and students are grouped according to their CGPA and backlog status. Students without backlogs are sorted by their CGPA in descending order, and then divided into equal-sized batches, typically four students per batch. If there are students with backlogs, they are grouped separately, ensuring an even distribution of students with backlogs across the batches. In cases where the number of students does not perfectly divide into batches of four, adjustments are made, and the final batch may have more or fewer students. Special attention is given to balancing the academic performance and backlog distribution within each batch. The third phase focuses on handling edge cases, ensuring that any exceptions or issues that arise during batch formation are addressed. If a batch cannot be formed with exactly four students, the batch size is adjusted for the remaining students. Additionally, students with borderline cases, such as those with backlogs but strong academic performance, are placed into batches based on their overall academic standing, ensuring a balance between CGPA and backlog status. This phase ensures that no batch is overloaded or imbalanced in terms of student distribution. Once the batches are formed, the finalizing batch assignments phase begins. Here, the final batch structure is reviewed to ensure that the students are distributed evenly, maintaining a balance in CGPA distribution across all batches. The backlog distribution is also confirmed to ensure an equal spread, preventing any batch from being overwhelmed by students with backlogs. The batch sizes are confirmed to be as balanced as possible, with slight adjustments made for any remaining students. This phase ensures

that the batch formation process is complete and meets the desired requirements. The testing and validation phase is crucial to ensure that the system functions as expected. During this phase, the entire process is simulated with sample data to verify that students are grouped correctly according to their CGPA and backlog status. Batch formation is validated to ensure that students are placed in the correct batches, and edge cases are properly handled. Any errors or inconsistencies in the batch formation process are identified and corrected. After testing and validation, the deployment and integration phase follows. If the institution already has a database or system in place, the batch formation logic is integrated into the existing system, ensuring seamless data transfer and retrieval. The solution is then deployed to a web server, where it is configured to handle file uploads for student data and display the results on a web interface. System performance is monitored, particularly during the batch formation of large student datasets, and optimizations are made as needed to ensure smooth operation.

The final phase of the methodology is documentation and reporting. This phase provides comprehensive documentation of the system design, including database schemas and the algorithms used for batch formation. Detailed reports are generated that highlight the distribution of academic performance across batches and how students with backlogs are assigned. Additionally, user documentation is provided to guide administrators through the process of uploading student data, initiating batch formation, and viewing the results. This ensures that the system is easily accessible and understandable for its users, enabling efficient operation and management.

Fig2:Final output page

VI.CONCLUSION

In conclusion, this project effectively addresses the critical challenge of organizing students into optimized study groups or batches within educational institutions. By automating the process of team formation based on student academic records and faculty expertise, the project streamlines administrative tasks, fosters academic collaboration, and ensures that students are

placed in well-balanced, high-performing groups. The use of student data, including marks, CGPA, and backlogs, allows for an efficient grouping mechanism that enhances the quality of education and mentorship. The project significantly reduces the manual effort involved in batch creation and ensures that students are placed in batches where their academic performance is balanced, leading to better peer interactions and collaborative learning. By separating students with backlogs into dedicated groups, the system ensures that they receive the necessary support to improve their performance, while students without backlogs are grouped together for a more advanced academic experience. Additionally, the automated faculty guide allocation based on domain expertise further strengthens the mentorship system, ensuring that students receive guidance from qualified and experienced mentors aligned with their academic needs. This enhances the overall educational experience by promoting effective learning and fostering strong mentor-mentee relationships. By optimizing the process of batch formation and faculty guide allocation, the project also contributes to improved academic outcomes, as students are better supported in their learning journey. The efficient distribution of students and faculty ensures that no batch is overloaded, and each faculty guide can focus on a manageable number of students. Overall, this project lays the foundation for a more efficient, data-driven approach to student grouping and mentorship in educational institutions. It not only enhances the administrative workflow but also positively impacts student engagement, academic performance, and overall institutional success. Future iterations of the project could incorporate machine learning, real-time data updates, and cross-institutional collaboration to further refine and optimize the student grouping and guide allocation processes, thereby revolutionizing educational management.

VII.REFERENCES

1.Jain, S., & Verma, H. (2014). Automation of Student Team Formation System: A Case Study. International Journal of Computer Applications, 97(10), 1-5. This paper discusses the automation of student team formation based on academic performance and course preferences.

2.Hassan, M. A., & Dey, A. (2019). A Data-Driven Approach to Assigning Students to Learning Groups Based on Performance and Interests. Journal of Educational Technology & Society, 22(1), 68-79.
Explores data-driven methods for forming

student groups in a way that promotes better learning outcomes.

3.Almalki, M., & Othman, M. (2018). Student-Teacher Matching Algorithm for Course Selection Using Genetic Algorithm. Computers in Human Behavior, 82, 150-160. Discusses the use of algorithms for student-teacher matching based on academic needs and domain expertise.

4.Williams, S., & Stevens, R. (2017). Enhancing Collaborative Learning through Group Formation: A Review of the Literature. Educational Research Review, 15, 121-135. This review highlights the importance of strategic group formation for collaborative learning in educational environments.

5.Salama, M., & Badran, M. (2015). A Hybrid Model for Grouping Students in Educational Systems. Proceedings of the International Conference on Computing, Communication, and Control Technologies, 30-35. Describes hybrid models that combine different criteria for grouping students to achieve balanced teams.

6.Kumar, R., & Soni, A. (2016). Data Management Techniques for Efficient Faculty and Student Allocations in Higher Education. International Journal of Database Management Systems, 8(4), 18-29. Provides insights into data management systems for optimizing student and faculty allocation in academic institutions.

7.Baker, R. S. J. D., & Inventado, P. S. (2014). Educational Data Mining and Learning Analytics. In Learning Analytics (pp. 61-75). Springer, New York, NY. An essential reference for understanding how educational data mining and analytics can be applied to automate processes like student grouping and performance analysis.

8.Liu, M., & McCauley, R. (2020). Faculty Allocation and Student Grouping in Online Learning Systems: A Review of Strategies and Techniques. Online Learning Journal, 24(3), 10-25. This article explores various strategies for faculty and student group assignments in online learning environments.

9.Khan, I., & Khan, F. (2017). Predictive Analytics in Educational Systems: A Review. International Journal of Educational Research, 85, 43-56. Reviews the use of predictive analytics in education, including how performance data can influence group formation and mentorship.

10.Dastbaz, M., & Lishchuk, V. (2019). Using Learning Management Systems to Facilitate Grouping and Collaboration: A Case Study Approach. Journal of Educational

Technology Development and Exchange, 12(2), 40-51.