Timetable Scheduling System Based on JSP Approaches and Students Feedback Analysis.

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***Abstract*— This paper outlines a technique for devising timetable organizing frameworks specifically for the educational sector, such as universities, colleges, institutes, etc. Generating an accurate and highly efficient timetable involves considering a variety of factors, including the availability of classrooms, labs, students, lecturers, courses, subjects, and time slots. These components create challenges in the production of a schedule, making the problem of providing increased flexibility and choices of time slots for "repeaters" even harder to solve. The system presented offers a faster, cost-effective, and accurate resolution to timetable management, supplying alternative solutions for timetable organization while preserving quality, dependability, and efficiency.**

This paper introduces a sentiment analysis method to consider student feedback at the conclusion of a semester. Its purpose is to perceive the feelings that are communicated and use the data to determine how to cultivate the quality of teaching. The system intends to provide students with the resources they need to receive a high-quality education.

***Keywords*— JSP approaches; automated scheduling;faculty feedback evaluation; sentiment analysis.**

I. INTRODUCTION

Despite the fact that course timetabling has been studied extensively in recent years, the need for a fully automated timetabling system that meets the requirements of all involved parties is still pressing. The primary challenge lies in the fact that the manual entry of details such as lecturer information, courses, classes, and time slots into the existing scheduling system is time-consuming and inefficient. It often requires multiple revisions to the timetable due to unexpected changes in the parameters. Despite the availability of various automated systems for solving the timetable scheduling problem, many educational institutions still prefer manual scheduling due to the limitations of the automated systems. Most of these systems lack certain features needed to fulfil the special needs of the users. As such, the planning process can be quite daunting, as there are numerous constraints to be taken into consideration, and it can be difficult to find a feasible solution. This paper presents an effective solution to the course timetabling problem by employing JSP techniques.

Assessment of class instructors by students at the conclusion of each academic term has become customary in higher education institutions. The primary aim of collecting students' feedback is to evaluate and enhance the quality of teaching. Such feedback enables instructors to refine their pedagogical methods and gain a more nuanced understanding of the students' perspectives. The evaluation of instructors typically utilizes Likert-scale scores, which, while useful, are limited in their capacity to capture the complexities of feedback.

Opinion mining, also known as sentiment analysis, seeks to identify the positive or negative expression of the author towards a specific entity. Its applications span diverse domains, such as social media marketing, finance, business intelligence, sociology, and politics. This paper aims to identify the sentiment polarity and faculty evaluations expressed in student feedback. The focal point of the study is to employ opinion mining techniques to categorize feedback received throughout a component estimate survey, thereby facilitating the understanding of students' comments on various aspects of teaching and learning, including modules, teaching methodologies, assessments, and others.

II. LITERATURE SURVEY

In their publication titled "Auto-Generate Scheduling System Based on Expert System," Nur Iqtiyani Ilham and colleagues present a novel technique for an intelligent auto-generated scheduling system. The proposed system, AGSS, provides the timetable committee with an approach to efficiently arrange workload by inputting relevant information, such as the number of lecturers, available classrooms, course offerings, laboratory facilities, and

student details, into an algorithm developed using Artificial Intelligence (AI) expert system. The system was developed using Xampp (database) and Visual basic (GUI). Utilizing the loaded information, the system is capable of automatically generating class timetables that can be customized by individual users. [1]

The difficulty of timetabling in a case study involving a faculty management system is examined by Bong Chia Lih and colleagues in their publication, "A Research on Heuristic Timetabling Technique for Faculty Course Timetable Trouble." The assignment of learners and professors to particular classes and time slots is necessary for this task. The researchers suggest a two-stage heuristic method that makes use of a genetic algorithm in order to address this problem. The courses that can be offered concurrently are gathered in one group in the first step. After that, in the second stage, the weekly time slots and locations for each group of classes are assigned. The authors give computational findings based on actual data to show how well their suggested method works. [2]

The report titled "Performance Analysis on Student Feedback using Machine Learning Algorithms" by Sharnitha Katragadda and colleagues explores the concept of opinion mining through supervised learning techniques in order to identify the sentiment expressed by students towards various teaching and learning aspects. The research involves the utilization of a combination of Artificial Intelligence and Natural Language Processing techniques on gathered student feedback data. Additionally, the report offers a detailed explanation of the opinion mining process using the Python open-source tool, along with a comparative analysis of the performance of extracted options such as examination and teaching. The findings of the study are compared to determine better performance with respect to various evaluation criteria for different techniques.[3]

In the paper entitled “Analyzing Students’ Feedback through Machine Learning and Lexicon-based Approaches”, Zarmeen Nasim and co-authors propose a novel approach that combines machine learning and lexicon-based techniques to conduct sentiment analysis on students’ feedback obtained at the end of each semester. The authors provide a detailed description of the sentiment analysis model, which is trained using a combination of TF-IDF and lexicon-based features to accurately identify and evaluate the sentiments expressed in the textual feedback. Additionally, a comparative analysis is conducted to evaluate the effectiveness of the proposed model relative to other established sentiment analysis methods. [4]

III. DESIGN AND METHODOLOGY

A. Methodology for Timetable Scheduling:

Many aspects, constraints, and outcomes from numerous sources have been taken into account in order to guarantee the project's success and the development of the algorithm. All information acquired for the timeline in this paper must be arranged and handled carefully in order to comply with the suggested methodology. In Figure 1, the block diagram of the system is shown. According to the system's process flow, the input facts, such as the list of lecturers, courses, classrooms/labs, and loading, are first asserted and loaded into the system to create the output facts that simulate the decision, such as the schedule for the lecture, student, course, and classroom/lab. The rules must be executed in a sequential order based on their priority to adhere to the knowledge.

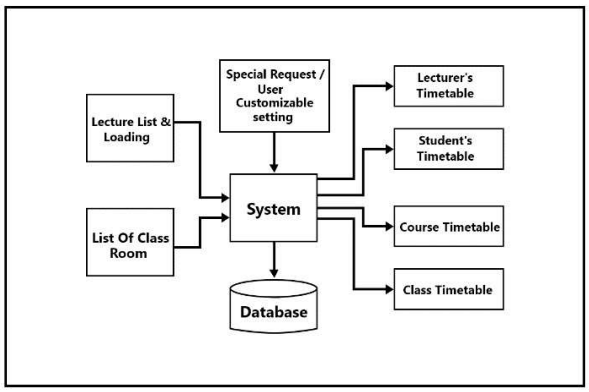

Fig. 1. Methodology for Timetable Generation System

Constraints:

- It is prohibited for lecturers and students to be allocated more than one class in the same room or at the same time.
- Concurrent scheduling of two distinct classes in the same room and time is not permitted.
- Prioritization should be given to lab sessions in scheduling before classes.
- Holding classes after 5 pm is not permitted.
- The maximum duration of consecutive classes for lecturers and students is four (4) hours.
- It is mandatory to reserve designated time slots for faculty meetings and special request events for lecturers.
- Lecturers are expected to be assigned to teach within their area of expertise upon request.

B. Methodology for Feedback Analysis:

The methodology put forward for the student feedback system focuses solely on collecting information related to learning experiences. The insights provided by the students are valuable to both the teacher(s) and the institution in their continuous endeavour to improve the quality of education. It should be noted that the feedback shared by the students will be treated as confidential. The overall progress will be assessed based on the aggregate scores obtained from the feedback responses of all students.

Parameters:

- Criteria for Subject Knowledge Area:
    1. Sequential coverage of syllabus
    2. Comprehension of delivered lectures
    3. Proficiency in the subject
    4. Preparation prior to class
- Evaluation of Communication/Presentation Skills:
    1. Capacity to sustain attention
    2. Vocal modulation and body language
    3. Engagement through questioning
    4. Clarity and coherence of language and explanation
- Evaluation of Teaching Aids:
    1. Effective utilization of reference materials and multimedia tools like PowerPoint, animations, etc.
    2. Clarity and legibility of board writing
- Evaluation of Classroom Discipline:
    1. Management of classroom behaviour.
    2. Punctuality and consistency in conducting classes.
- Evaluation:
    1. Comments or feedback provided on tests and assignments
    2. Quality and relevance of homework and class assessments
- Evaluation of Conduct:
    1. Global impression
    2. Capacity to inspire and motivate students
    3. Accessibility for assistance and consultation

Points Assigned:

- Excellent: 4
- Good: 3
- Average: 2
- Below Average: 1

Faculty feedback evaluation:

Average grading = (4xN1 + 3xN2 + 2xN3 + 1xN4)/100

Where, N1 = No. of responses for Excellent
N2 = No. of responses for Good
N3 = No. of responses for Average
N4 = No. of responses for Below Average

Criteria for Subject Knowledge Area Average (A1) = [(1) + (2) + (3) + (4)]/4
Evaluation Communication/Presentation Skills Average (A2) = [(5) + (6) + (7) + (8)]/4
Evaluation of Teaching Aids Average (A3) = [(9) + (10)]/2
Evaluation Classroom Discipline Average (A4) = [(11) + (12)]/2
Evaluation Average (A5) = [(13) + (14)]/2
Evaluation of Conduct Average (A6) = [(15) + (16) + (17)]/3

Sum = [A1 + A2 + A3 + A4 + A5 + A6]
Overall Grading = sum/6

Sr.	Parameters	(N1)	Good (N2)	(N3)	(N4)	grading
1	syllabus	11	20	4	0	3.20
2	delivered.	14	18	3	0	3.31
3	Knowledge of the subject	17	17	1	0	3.46
4	Preparation for the class	14	20	1	0	3.37
	Criteria for Subject Knowledge Average : [(1) + (2) + (3) + (4)]/4					3.34
5	Ability to hold your interest	15	17	3	0	3.34
6	Voice and gestures	16	18	1	0	3.43
7	questions	16	16	3	0	3.37
8	explanation	16	17	2	0	3.40
	Evaluation of Communication/Presentation Skills : [(5) + (6) + (7) + (8)]/4					3.39
9	PowerPoint /Multimedia /	12	21	2	0	3.29
10	Clarity in board writing	18	14	3	0	3.43
	Evaluation of Teaching Aids : [(9) + (10)]/2					3.36
11	Class control	19	14	2	0	3.49
12	classes	13	18	4	0	3.26
	Evaluation of Class Room Discipline : [(11) + (12)]/2					3.37
13	tests, assignments	16	15	4	0	3.34
14	tests are relevant &	13	21	1	0	3.34
	Evaluation : [(13) + (14)]/2					3.34
15	Overall impression	15	17	3	0	3.34
16	Ability to motivate students	17	16	2	0	3.43
17	Availability for help and consultations	17	17	1	0	3.46
	Evaluation of Conduct : [(15) + (16) + (17)]/3					3.41

Sr.No.	Parameters	Average Grading
1	Subject Knowledge	3.34
2	Communication/Presentation Skills	3.39
3	Use of Teaching Aids	3.36
4	Class Room Discipline	3.37
5	Evaluation	3.34
6	Behavior	3.41
	Sum	20.20
	Overall Grading = Sum / 6	3.37

IV. CONCLUSIONS

A successful implementation of JSP approaches with user customization options will result in the creation of a class timetable. The system will automatically generate separate timetables for student groups, lecturers, and classrooms while ensuring no conflicts arise from input data. Additionally, the system will allow users to customize the timetable to their preferences. By maintaining quality, reliability, and functionality, the proposed system will serve as an effective solution for timetable management.

A system for mining student feedback has been developed to gather points of concern for each faculty member as rated by the students, which can be utilized for performance evaluation. This approach can prove useful in enhancing student learning experiences and improving teaching methods. Automating the feedback process can offer numerous benefits such as cost and time savings, and efficient report generation. The integration of opinion mining can aid in summarizing the feedback report effectively and assessing the institute's performance.

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