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# Web-Based Application for Automatic Timetable Generation

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**ABSTRACT**: Timetabling Problem is NP-Hard problem which is very difficult to solve by using conventional methods. A lot of complex constraints need to be addressed for development of an efficient algorithm to solve this timetabling problem. Therefore, there is a great requirement for an application distributing the course evenly and without collisions. There are various tools available for generating timetable. This tool can reduce our manual work of generating timetable but limitations of this tool is that it requires more time, gives less accuracy and also error rate is high. So, our aim here is to develop a simple, easily understandable, efficient and portable application, which could automatically generate good quality timetable within seconds. In the present scenario, all the college related work such as making the defaulter list of students and measuring the performance of a teacher according to feedback given by students is done manually. All these tasks are time consuming and also require a lot of efforts and resources. To solve these problems our system uses Sentiment analysis API for generating feedback of teacher. System generates teacher's performance graph according to feedback given by student. The system will also send alert message to students if their attendance is less than 75% .The main purpose of our system is to reduce the work load of teachers and also be a cost effective and a quick respondent system.

**KEYWORDS**: Hard constraints, soft constraints, *Sentiment analysis*, MashapeAPI , Workload, Attendance sheet.

## I. INTRODUCTION

Timetable scheduling is a complex optimization problem. It is also known to be computationally NP-hard problem. Many researchers have been developed a timetable scheduling software and have been tested or applied on an experimental basis with a various population of students & constraints. But when the resources (labs, teachers, classroom) are less or required to generate college timetable for two shifts in that cases existing timetable scheduling software does not produce the optimal solution. Also existing timetable scheduling software require more time to produce timetable and give less accuracy also error rate is high, so to overcome this drawback we develop a simple, easily understandable, portable and efficient application, which could automatically generate good quality time tables within seconds. In many college feedback for teachers is collected from student through papers and then this feedback paper is checked manually. All these tasks require a lot of efforts and resources and also time consuming. If student attendance is less than 75% then teacher send message to particular student manually. *T*o reduce the work load of teachers proposed system is developed.

## II. RELATED WORK

There exist various timetable generation problems such as Employee Timetabling, University Timetabling, Sports Timetabling and Examination Timetabling. A large number methods have been already proposed for solving timetabling problems. These methods come from a number of scientific disciplines like Operations Research, Artificial Intelligence, and Computational Intelligence and can be divided into four categories:

1) Sequential Methods :- Sequential Methods, that deals timetabling problems as graph problems. Generally, they order the events using domain specific heuristics and then assign the events sequentially into valid time slots in such a way that no constraints are violated for each timeslot.

2) Constraint Based Methods :-In constraint based methodfor set of variables assigned different values(classroom, practical lab) in order to satisfy a number of hard and soft constraints.

3) Cluster Methods :- In which the problem is divided into a number of events sets. Each set is defined so that it satisfies all hard constraints. Then, the sets are assigned to real time slots to satisfy the soft constraints as well.

4) Meta-heuristic methods :- Meta-heuristic methods, are higher level procedure which is used to provide good enough solutions for optimization problems. On some class of problems, they do not guarantee a globally optimum

solution. This method is used when the classical methods are too slow or fail to give a solution. This is achieved at the cost of optimality and precision for speed. Meta-heuristic methods, such as genetic algorithms (GAs), simulated annealing, tabu search, and other heuristic approaches.

## III. FEATURES

1. Generate timetable for two shifts parallel.
2. Regeneration of timetable until an optimal solution is obtained
3. Generation of defaulter list of student using the attendance sheet given by teacher.
4. Sending e-mail to the students if their name is in the defaulter list.
5. Taking feedback from students through web page for teachers.
6. Display the performance graph of each faculty.

## IV. PROPOSED SYSTEM

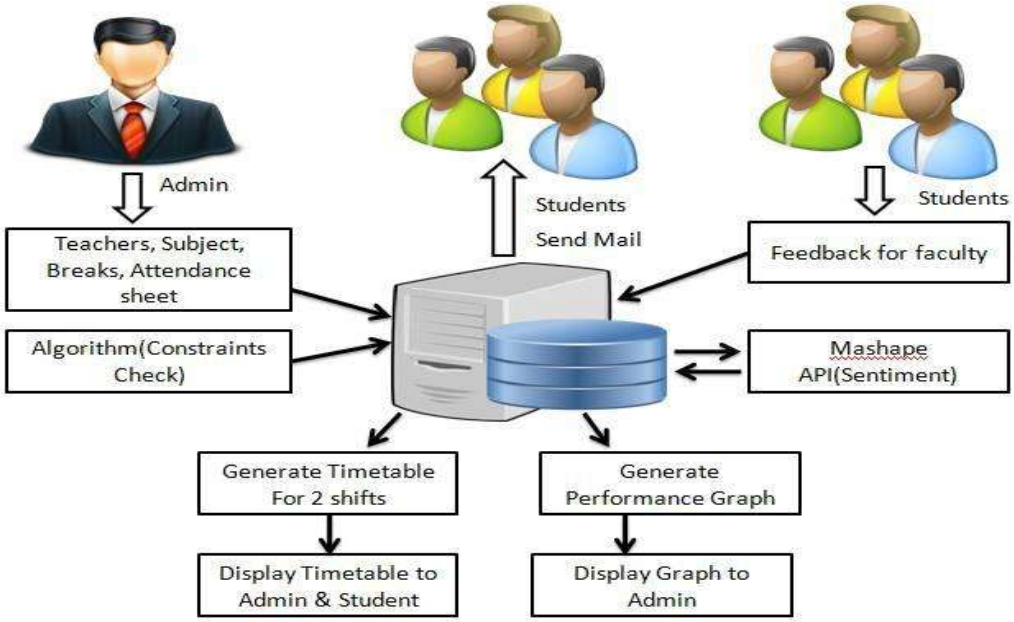


Figure. Architecture of proposed system

## SCOPE

1. Automatic timetable generation by considering hard and soft constraints.
2. Feedback generation by using Mashape API.
3. Generate defaulter list from attendance sheet.

### OBJECTIVE

1. To reduce a time required for generating time table than existing system.
2. To generate performance graph for each faculty according to feedback given by student.
3. To increase efficiency and accuracy of proposed system.
4. To generate defaulter list of students and send the e-mail to defaulter students.
5. To help teachers to maintain attendance record of students.
6. To reduce paper and labour work.

## V. METHODOLGY AND DISCUSSION

### TIMETABLE GENERATION

In our system we generate dynamic timetable. College start time and end time is not fixed. Admin enter start time, end time, number of subject, each subject teacher name, workload of each subject is mentioned by admin. Admin can add the subject in database and assign teachers to subject. Timetable is generated for two shifts that is first and second shifts. Timetable is generated by considering the class rooms, labs, teacher availability. Occurrences of all subject are also considered. In one day there will not be full lectures or practical's. Once the timetable is generated admin can import student and teacher contact information then timetable is sent to all teachers and student through email using email information which is given by admin.

### FEEDBACK GENERATION

Student can give the feedback for any faculty which are added by admin. Once the feedback is given by student using web page then this feedback automatically sent to sentiment API. Sentiment API will send result to timetable and feedback generation system. Feedback will be generated in three forms that is positive, negative, neutral. Once the sentiment and confidence received from sentiment API admin generates performance graph for faculty. Teacher performance graph can only be view by admin.

### DEFAULTER LIST GENERATION

For Defaulter list generation admin will import the attendance sheet which is in csv format. Once the attendance sheet imported by admin system automatically sent alert mail to defaulter student.Student who have attendance less than 75% those students are considered as defaulter student. Alert mail will also be sent to defaulter students parent's.

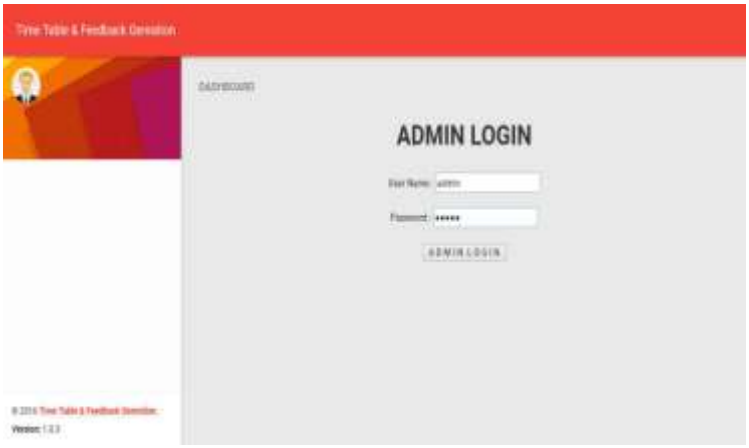


Figure.1 Admin Login

Admin enter user id and password for login.This Page is used for authentication of admin. The entered user id and password is matched with the user id and password stored in encrypted format in database. If user id and password matches then directed to home page otherwise display message to login again.

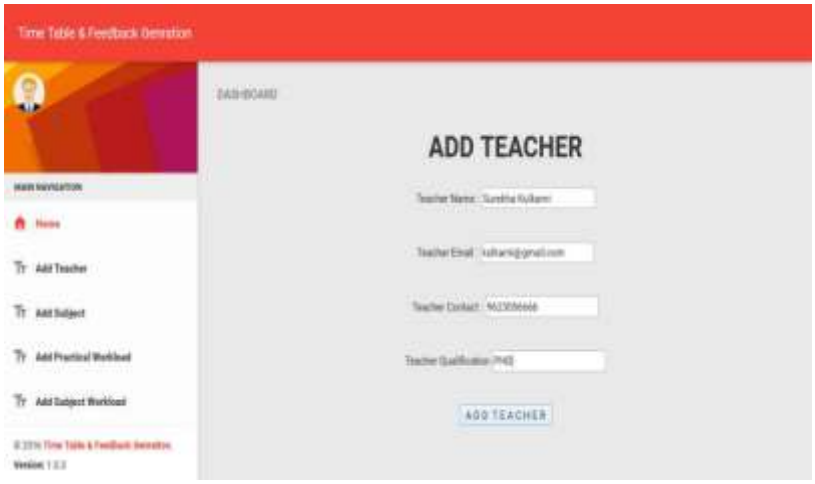


Figure.2 Add Teacher Page

Admin adds information of teachers on this page which is used for timetable generation and performance graph generation for faculty.The information includes name,email id,contact details and qualification. This information is stored in teacher table.


Figure.3 Timetable

Here by using data which is stored in database timetable is generated for both the shifts parallel. It checks both hard constraints and soft constraints, while generating the timetable. Print option also available for print the timetable. Timetable is only created by admin.

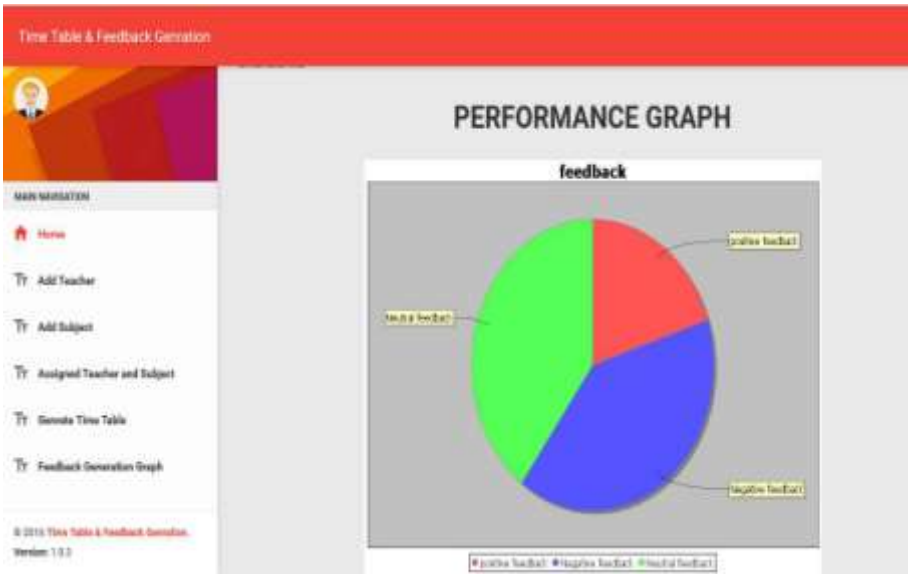


Figure.4 Performance Graph

Admin generate the performance graph for any faculty Based on feedback given by students. Student give the feedback for any faculty then this feedback will be sent to sentiment API then sentiment API sent result in the form of positive, negative or neutral.

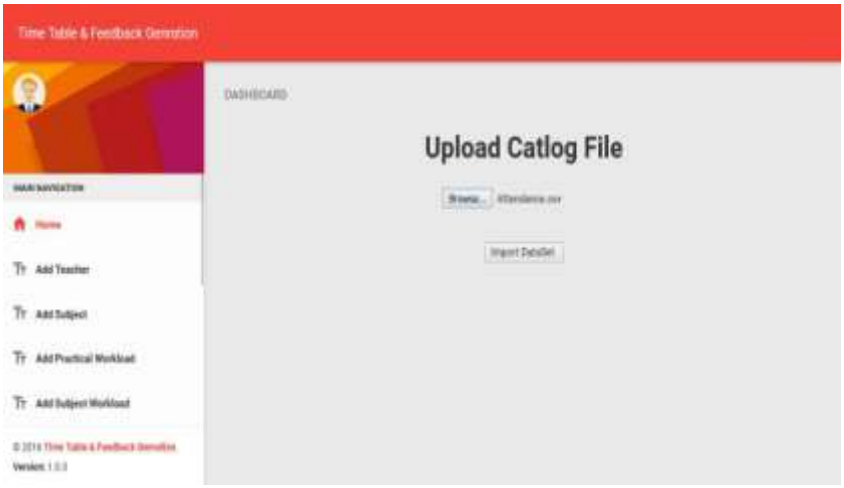


Figure.5 Upload Catlog file

Admin import file which includes the attendance of students then system will sent alert mail to defaulter student. Attendance sheet must be in csv format. System will check attendance of student if attendance is less than 75% then system automatically sent alert mail to both parents and student.

## VII. CONCLUSION

Timetable generation application will simplify the process of time table generation which may otherwise needed to done using spread sheet manually possibly leading to constraints problem that are difficult to determine when time table is generated manually. The intention of the system is to generate the time table automatically.

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