Automated college timetable generator

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Abstract—Many colleges use manual way of preparing timetables with large number of students is very time consuming. This usually ends up with various courses clashing this may be either at same room or with same teachers having more than one course at a time. These are just due to common human errors which are very difficult to prevent in the processes. To avoid these problems people usually taking the previous years' timetable and modifying it but still it is a difficult job to do incorporate changes. To overcome all these problems we propose this system. This system will take various inputs like details of students, subjects and classrooms and teachers available, depending upon these input it will generate possible timetable, making the utilization of all of these resources in a way that will best suit any of constrains of college rules.

Index Terms— Timetable, scheduling, constraints, time slot

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1 INTRODUCTION

T Time table scheduling has been in human requirements since they thought of managing time effectively. It is widely used in schools, colleges and other fields of teaching and working like crash courses,

In early days, time table scheduling was done manually with a single person or some group involved in task of scheduling it with their hands which take lot of effort and time. While scheduling even the smallest constraints can take a lot of time and the case is even worse when the number of constraints or the amount of data to deal with increases.

Even the perfectly designed time table is reused for whole generation without any changes, proving to be dull in such situations. Other cases are caused because the problem is the number of employers or workers keeps changing, this result in rescheduling of time table urgently.

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Institutions/Schools/Colleges/Universities are the regular users of such timetables. They need to schedule their course to meet the need of current duration and facilities that are available to them. However, their schedule should meet the requirement of new course addition and newly enrolled students to fresh batches with sections.

This may result in rescheduling the entire time table once again for its entire batches and to be scheduled in shortest possible time before the batches course start. Another problem that occurs is while scheduling time table for exams.

2 LITERATURE SURVEY

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"Dipti Srinivasan Tian Hou Seow Jian Xin Xu" [1] proposed that finding a feasible lecture/tutorial timetable in a large university department is a challenging problem faced continually in educational establishments. This paper presents an evolutionary algorithm (EA) based approach to solve a heavily constrained university timetabling problem. The approach uses a problem-specific chromosome representation. Heuristics and context-based reasoning have been used for obtaining feasible timetables in a reasonable computing time. An intelligent adaptive mutation scheme has been employed for speeding up the convergence. But this system is difficult to implement since it considers entire university problem and evolutionary algorithm.

Antariksha Bhaduri "University Time Table Scheduling using Genetic Artificial Immune Network" [2] in their article proposed that Scheduling is one of the important tasks encountered in real life situations. Various scheduling problems are present, like personnel scheduling, production scheduling, education time table scheduling etc. Educational time table scheduling is a difficult task because of the many constraints that are needed to be satisfied in order to get a feasible solution. Education time table scheduling problem is known to be NP Hard. Hence, evolutionary techniques have been used to solve the time table scheduling problem. Methodologies like Genetic Algorithms (GAs), Evolutionary Algorithms (EAs) etc. have been used with mixed success. In this paper, we have reviewed the problem of educational time table scheduling and solving it with Genetic Algorithm. We have further solved the problem with a mimetic hybrid algorithm, Genetic Artificial Immune Network (GAIN) and compare the result with that obtained from GA. Results show that GAIN is able to reach the optimal feasible solution faster than that of GA.

"Shengxiang Yang, *Member, IEEE*, and Sadaf Naseem Jat"[3] proposed that The university course timetabling problem (UCTP) is a combinatorial optimization problem, in which a set of events has to be scheduled into time slots and located into suitable rooms. The design of course timetables for academic institutions is a very difficult task because it is an NP-hard problem. This paper investigates genetic algorithms (GAs) with a guided search strategy and local search (LS) techniques for the UCTP. The guided search strategy which is used here is to create offspring into the population based on a data structure that stores information extracted from good individuals of previous generations. The LS techniques use their exploitive search ability to improve the search efficiency of the proposed GAs and the quality of individuals. The proposed GAs is tested on two sets of benchmark problems in comparison with a set of state-of the- art methods from the literature. The experimental results show that the proposed GAs is able to produce promising results for the UCTP.

3 PROPOSED SYSTEM

The figure1 represents timetable generator consists input module, and as output timetable will be generated.

A. Input Data

The input data module can be described by a type of data given, the data contains:

- Person: which describe the name of lecturers.
- Subject: which describe the name of the subjects belonging to desired year and semesters.
- Room: which describe the name of the class
- Time interval: it's a time slot with a starting time and duration.
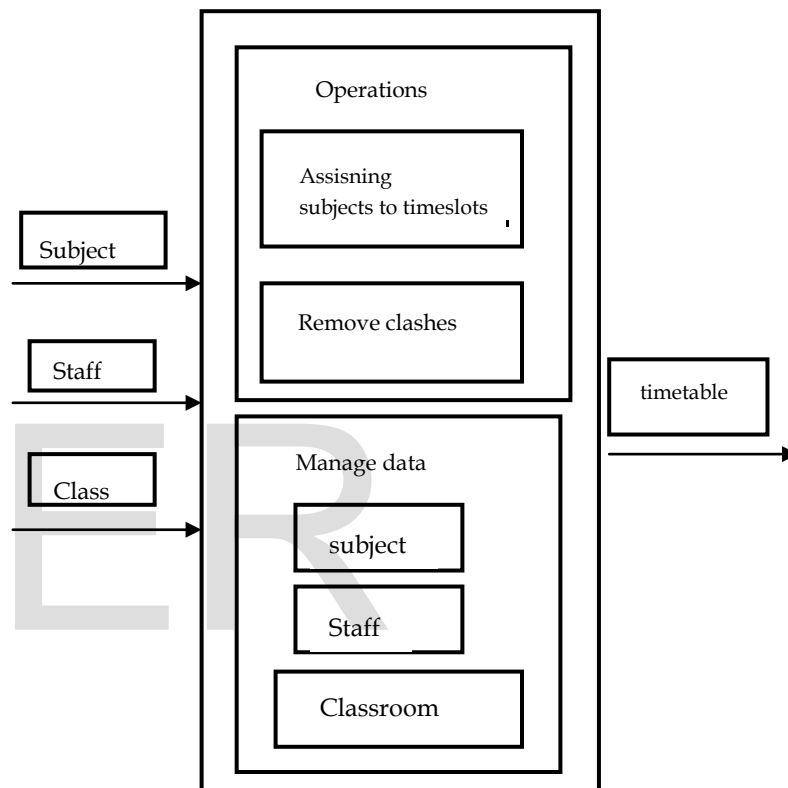

Fig 1: system model

B. Constraints

Constraints can be divided into 3 parts:
- Validity violation constraints
- Hard constraints
- Soft constraints

1) Validity violation constraints:

   These are the constraints which are needed to be followed:

- There are certain lecturers that may appear at the same time in more than one class.
- The most trivial violation constraint is that a teacher must not clash in two different tables of a time table.
- Fixed slots.

2) Hard constraints: Hard constraints are the one's which needs to be fulfilled necessarily.

- Class room must not be double booked.
- Every class must be scheduled exactly once.

2) Soft constraints: These are the constraints that are not that obvious but still demanding. They are not to be really satisfied but the solutions are generally considered good if large numbers of them are taken care.

- No consecutive lectures of the same teacher in the class.
- Minimize continuous lectures of the same course in a day.
- Same teacher must not have consecutive periods unless specified.
- Assigning fixed slots for particular subjects.

4 IMPLEMENTATION

This system is implemented using the minimum hardware requirements like RAM 512MB and above, hard disk used is 20GB or above, processor used is 2.4GHz or above, display is standard output display and data input is keyboard/mouse.

Software requirements deal with defining software resource requirements and prerequisites that need to be installed on a computer to provide optimal functioning of an application. These requirements or prerequisites are generally not included in the software installation package and need to be installed separately before the software is installed.

Languages used are Java, HTML, CSS, Database used is MYSQL, Compiler is Net Beans, Web server used here is Glass fish, Operating system is Windows 7/8/10.

5 RESULT AND ANALYSIS

The final system should be able to generate time tables in completely automated way which will save a lot of time and effort of a department administration. Focus on optimization of resources i.e., teachers, classrooms etc. Provide a facility for everyone to view the time table. This application is provided with necessary details of faculty and subjects which are stored in database and then by making use of available data it generates timetable with minimum time when compared to manual generation of timetable.

6 CONCLUSION

The major benefit of this project is to store information at one place and it can be accessed via online transaction.

Instead of tedious paper work, students can view the timetable with a quick turnaround. This system is user friendly and provides faster and better generation of timetable, which in turn saves time. There are few points that justify the need of this system:

- user friendly
- faster and better generation of timetable
- Saving time and manpower.

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