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Anonymous Schedule Generation Using Genetic Algorithm

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Abstract—**In this proposed system, a genetic algorithm is applied to automatic schedule generation system to generate course timetable that best suit student and teachers needs. Preparing schedule in colleges and institutes is very difficult task for satisfying different constraints. Conventional process of scheduling is very basic process of generating schedule for any educational organization .This study develop a practical system for generation of schedule .By taking complicated constraints in consideration to avoid conflicts in schedule. Conflicts means that generate problem after allocation of time slots.**

Keywords—Genetic Algorithm (GA), Constraints, Chromosomes, Genetic operators.

I. INTRODUCTION

Preparing timetable is most complicated and conflicting process .The traditional way of generating timetable still have the error prone output, even if it is prepared repeatedly for suitable output .The aim of our application is to make the process simple easily understanding and efficient and also with less time requirements therefore there is a great need of this kind of application in educational institute.

Timetable generating has been in most of the human requirements and it is most widely used for educational institutes like schools, colleges and other institutes, where we need planning of courses, subjects and hours. In earlier days timetable scheduling was a manual process where a one person or the group of some peoples are involved in this process and the create timetable with their hands, which take more efforts and still the output is not appropriate.

The courses scheduling problem can be specified as constraint satisfaction problem (CSP). Constraints in the scheduling process can be categories into two constraints Hardware Constraints and software Constraints. Common hardware constraints include [1] Each time slot should be scheduled to a specified time .[2] Each teacher or student can be allocated only one classroom at a time.[3] All students must be fit into that particular allocated classroom. Some of the software constraints include [1] Both faculty and student should not unconnected timeslots in timetable.[2] Classroom have limited capacity.

II. LITERATURE SURVEY

There are different problems in generation of timetable. There are some methods to solve this problem of schedule generation like Cluster method, Sequential method, Meta-Heuristic and Constraint based method. Meta-Heuristics is the procedures to provide better solution for timetabling problem. For some kind of problems, these methods do not guarantee a globally optimal solution. These methods are used when classical methods are too slow or fail to give appropriate solution and it is achieved at the cost of optimality and correctness. Genetic algorithm is a Meta-Heuristic method. Genetic algorithm has been described in the book "Adaptation in natural and artificial systems" in the year 1975. Genetic Algorithm comes under the class of evolutionary algorithm that use the strategy of natural selection to derive a set of solution towards the optimum solution. It is a search heuristic method for generation of schedule to optimization problem using techniques like mutation, inheritance, crossover and selection which are used by natural evolution. This algorithm starts with the set of candidate solution called as population. Each solution in the initial candidate solution i.e. population is a set of characteristics of or its chromosomes which can be alter and mutated later. Solutions from one population is used to make another population to derive new population will be more reliable than old one. The fitness of the solution identifies the number of constraints that violates the schedule. If the violating constraints are less then fitness of the schedule is considerate more. By using this system problem of schedule generation will be solved by using genetic algorithm. This approach uses a problem specific chromosome representation. Heuristic and context based reasoning is used for having a better solution in reasonable time. An adaptive notation method is used for speeding up the conversion.

III. ALGORITHM

Step1: Partition the training set Tr into m subsets through random sampling;

Step2: Apply decision tree algorithm to each subsets S 2S m;

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Step3: Apply each included tree from step2 (Tree, Tree2 Tree m) to the test set T e;

Step4: Use fitness function to evaluate performance of all trees, and rank the trees with their related subsets according to trees' performance;

Step5: Perform GA operations:
   a. Selection: select the top (1 – c) m subsets and keep them intact into next operation;
   b. Crossover: for remaining cm 12 pairs, perform two points crossover;
   c. Mutation: randomly select mu subsets to perform mutation operation. Randomly replace one instance in selected subset by one instance randomly selected from the original training data set.

Step6: New subsets are created from step5 as the next new generation, then replicates step2 to step6, until identify a subset and a related tree with ideal performance.

1. Input data:
   The first step in functioning of GA is generation of an initial input data; each individual is evaluated and assigned a fitness value according to positive fitness function.

2. Selection:
   This operator selects chromosome in data for reproduction. The better chromosome to fit, the more times it is likely to be selected to reproduce.

3. Crossover:
   It is a genetic operator is used to vary coding of a chromosome from one generation to the next. In crossover process it takes one or more than one parent solution and find the child solutions from the parent solution.

4. Mutation:
   In mutation solution may change from the previous one solution. Mutation is the process in which the data can be interchange for the best solution. When the given solution is not reliable or there is conflicts are available then mutation and crossover techniques are very important. It decides which result is best for given input data.

5. Fitness Function:
   Fitness function is used to find the quality of represented function. This function is problem dependent. Infield of genetic algorithm design solution is represented as a string it refers as chromosome .In the each phase of testing it delete the 'n' worst result or condition and create 'n' new ones from the best design solution and the final result is obtained from that solution.

IV. PROPOSED SYSTEM

In this proposed system is based on customer centric strategy in designing of scheduling system. Firstly a data mining algorithm is design for mining student preferences in different course selection from historical data. Then based on selection pattern obtain from mining algorithm for scheduling is designed, which leads to develop an integrative, automatic course scheduling system. This system is not only help to increase the student satisfaction of course scheduling system result.

In this proposed system adopts the user's perspective and applies different types of techniques to an automatic scheduling and also considers teacher preferences and student needs in their schedule, so that final output fulfills the expectations at each and every users. This algorithm is used for exchanging course that are given to the system as input, so as to find optimal solution for timetabling problem.
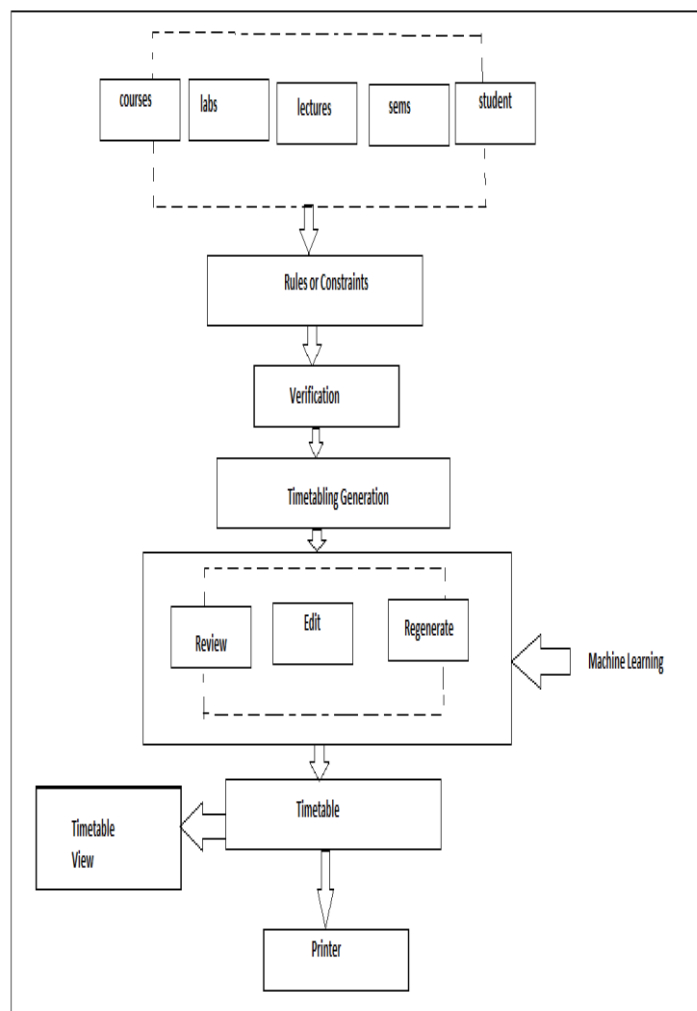
V. SYSTEM ARCHITECTURE

Fig. System Architecture

Input data:
1. Courses
2. Labs
3. Lectures
4. Sems

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5. Students
Output data:
System constraints categories into two parts:
1. Hard constraint:
a. Each course should be scheduled to a specified time.
b. Each teacher or student can be allocated only one class at a time.
c. All students assigned to particular assigned class must be able to fit into that class.
2. Soft constraint:
a. Some of the soft constraint include faculty and student should not have unconnected time slots in time table.
b. Classrooms have limited capacity.
c. Student should not have any free time between two classes on a day.

Fig. Structure of Timetable generation

VI. ADVANTAGES

[1] Eliminate paper based process:
Means manual timetable system requires paper work due to this system paper work will be eliminate by automatic timetable generation system.

[2] It helpful for authority:
Making schedule manually is time consuming process this system going to be generate schedule automatically that's how the faculty concentrate or focus on other work instead of wasting their time on making timetable.

[3] User friendly and save time:
This system is simple and easy to use. Means no deep or technical knowledge is required to operate it. This proposed system generate schedule automatically so it take less time for generate timetable.

[4] Customization and flexibility:
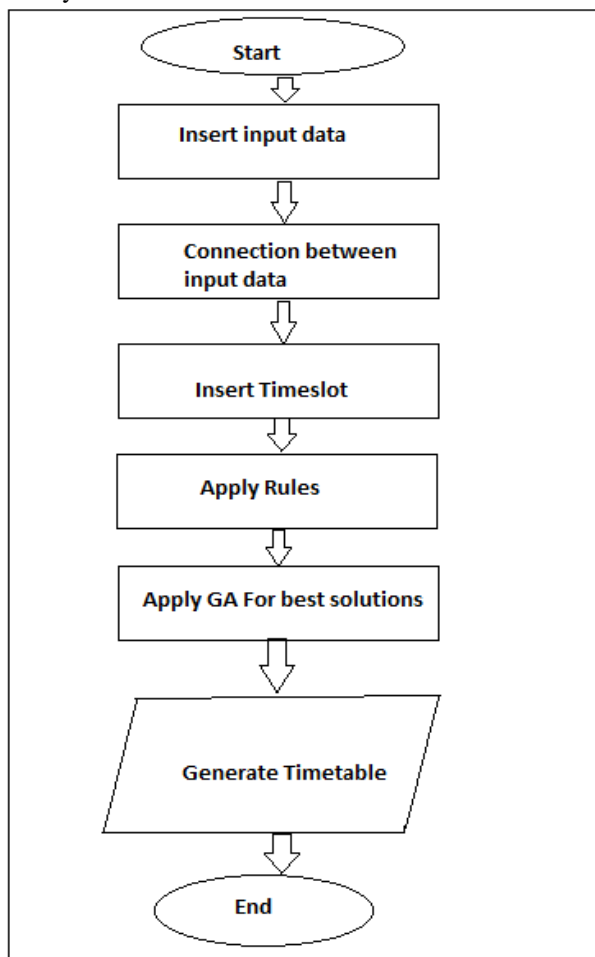This system can be fully customized to meet the particular class scheduling needs and suggestions

VII. ACKNOWLEDGMENT

VIII. CONCLUSION

This system satisfy needs of teachers for making a schedule for the department .By using this system , it reduce the paper work and it takes less time for making a schedule. It removes the conflicts in schedule at the time of generation of schedule. This system is made to meet particular class suggestions and scheduling needs .This system generates a much more accurate and precise than ones created manually. This system uses a real data of the various department of institute to test methods and how effectively it is functioning or working.

IX. FUTURE WORK

To improve the overall process of schedule generation for any educational institute by giving all input at once or can give input file system.
An system will free of human errors that will make process more user friendly and convenient. This will require less human effort requirement for system that will automate the process of generation of schedule.

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