A Comprehensive survey on Automated Time Table Management System

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***Abstract*- A college time table is a temporal arrangement of classrooms and lectures satisfying all the constraints. The manual system is preparing time table in college with a large number of students is very time consuming and resources taking process and usually end up crashing either at the same room or with the same teachers having more than one class at a time. To avoid all these problems people usually take the previous years' time table as a reference and try to make modifications in it but still, it is a tedious job to make changes. To overcome all these problems, we have developed this automated time table management system. The system will take various details like faculty, course, rooms, and department, depending upon these inputs it will generate a possible time table., making optimal utilization of all resources in a way that will best suit any of the constraints. We also have incorporated many features like employee leave, assigning leave, and attendance module along with its report. A list of subjects may include electives as well as core subjects. It will save precious time for administrators who are involved in creating and updating tome tables. So, our aim is to develop a generic software which can be used as an alternative to the existing manual system.**

***Key words*— Timetable, Scheduling, Genetic Algorithm, Evolutionary Algorithm, NP-Complete Problem**

I. INTRODUCTION

The main theme of the project is to generate the time table by taking the course information, faculty information, as input and generate the time table satisfying all the constraints. It will help to manage all the periods automatically and also will be helpful for employee to get timetable in their phone by using application. It will also manage timetable when any faculty is absent, or late coming. Maximum and minimum work load for a faculty for a day, week, and month will be specified for the efficient generation of timetable. By using this software employee can apply for leave by providing date, reason and also with substitute faculty. Planning time table is one of the most complex and error-prone applications. There are still serious problems like generation of high cost time table that are occurring while scheduling and these problems are repeating frequently. Therefore, there is great requirement for an application, distributing the course evenly and without collisions. This project is meant for generating time table schedule in an educational institution which could minimize the human work and maximize the efficiency. Even at the optimal stage of manual time table system, there exists a chance of clash and redundancy. So, our software is intended to serve the purpose of minimizing redundancy. The aim here is to develop a simple, easily understandable, efficient and portable application, which could automatically generate good quality time table in less time.

There are certain problems prevailing due to lack of automated time table management system:

- Various classes clashing either at same room or with same faculty having more than one class at a time.
- Redundant information is a major problem.
- Difficult to maintain time table due to vast quantity of records.
- Time consuming and resource taking process.
- It became very difficult to modify the conventional time table system.

The product name is **"**Automated Time Table Management System**"**, which is a simple graphical user interface that will allow users to easily generate the required time table which is an alternate for manual system. The time table will be generated as according to the information provided by the user. Planned time table is one of the most complex and error-prone applications. There are still serious problems like generation of high cost

time tables are occurring while scheduling and these problems are repeating frequently. Therefore, there is a great requirement for an application distributing the course evenly and without collisions.

II. WHAT THIS PAPER INCLUDES

Automatic Timetable manger is a Java based software used to generate timetable automatically. This software will help to manage all the periods automatically. Proposed system will help to generate it automatically also helps to save time. There is no need for faculty to worry about their period details and maximum workload. It is a comprehensive timetable management solution for colleges which helps to overcome the challenges in current system. It will satisfy the user requirements and is easy to operate and most importantly, this project is scalable i.e., other functionality can be added when it is required.

III. LITERATURE SERVEY

A time table is an organized list usually in a tabular form providing information about a series of arranged events in a particular time.

A. *Evolutionary Algorithm*-

Evolutionary Algorithm (EAs) are a class of direct, probabilistic search and optimization algorithms gleaned from the model of organic evolution. A Genetic Algorithm (GAs) is a type of EA and is regarded as being the most widely known EA in recent times A GA differs from other search techniques in the following ways: -

- Gas optimize the trade-off between exploring new points in the search space and exploiting the information discovered this far.
- Gas have the property of implicit parallelism. Implicit means that the Gas effect is equivalent to an extensive search of hyper planes of the given space, without directly testing all hyper plane values. Schema denotes a hyper plane.
- Gas work with a coding of the parameter set, not the parameters themselves.
- Gas search from a population of points, not a single point.

The most commonly reported implementation involves the use of hybrid algorithms. It is demonstrated that the literature is currently converging on the use of constraint-based solution algorithms and implementations.

B. *NP-Complete Problem*

Np-Non deterministic Polynomial time solving. Problem which can't be solved in polynomial time like TSP (Travelling Salesman Problem) or an easy example of this is subset sum. Np problems are checkable in polynomial time, means that given a solution of problem, we can check that whether the solution is correct or not in polynomial time. Although any given solution to the timetabling problem can be verified quickly, there is no known efficient way to locate a solution in first place. Genetic algorithm has been the widely used in generating near optimal solution to time tabling problem, hence its usage in the implementation of this project.

Dipesh Mittal proposed **"**Automatic Timetable Generation using Genetic Algorithm.**"** [1] This algorithm reduces time consumption and the pain in framing the timetable manually. The approaches of this algorithm are simplified design and reduced development time. This project is little time consuming and consist of Human errors along with low level of efficiency. Once a timetable is generated, it cannot modify.

Spyros Kazarlis proposed **"**Solving University Timetabling Problems Using Advanced Genetic Algorithms.**"** [2]

In this paper they presented an advanced GA based method for solving.[3]

I) Advantages:

- Is faster and more efficient as compared to the traditional methods.
- Has very good parallel capabilities
- Useful when the search space is very large and there are a large number of parameters involved.

II) Limitations:

- Being stochastic, there are no guarantee on the optimality or the quality of the solution
- If not implemented properly, the GA may not converge to the optimal solution.

IV. MODULES

1. *Admin Module*

- The admin is responsible for generating a software with given set of rules to make a automated time table management system.

2. *Faculty Mode*

- The faculty gives all their details to the admin
- In case the faculty associated for the class takes a leave then the substitute faculty will be assigned to that class.
- The substitute faculty can accept or reject the offer according to their schedule.
- After keeping all these points in mind timetable is generated.

3. *Time Table Generation Mode*
    - In this module, generation is done by considering the maximum and minimum workload for each faculty. This will be generated by the software on the based of given rules and will be viewed by the faculty who are the users of this system.

V. BENEFIT OVER PREVIOUS SYSTEM

Automated time tabling system can allow users to generate time table for newly occurring changes in less time, with less efforts and with more efficiency. It will allow users to work on and view time table in different platforms and view different information simultaneously. The software will create individual schedules also i.e. it will create academic schedule, examination schedule, class schedule.

Project management plan

The followings steps are followed for making this software:

1. Tasks
    - Analysis of major deliverables
    - Storing the data in database
    - Documentation and modelling
    - Approval to documentation
    - Creating a user interface
    - Coding for interface
    - Testing the project

2. Information Gathering
    - During information gathering we observed that making a daily clash free time table is a very tedious task. It is very difficult to create a clash free time table.

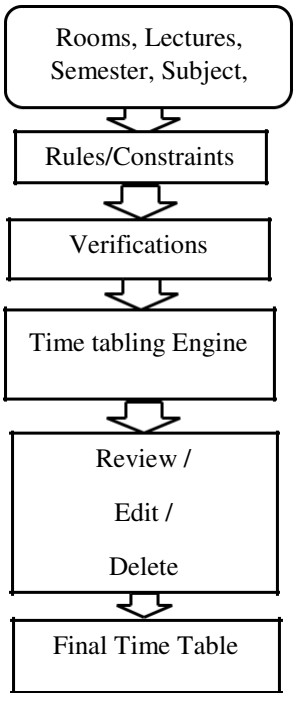
3. Resources Needed
    a. Processor: Pentium(R) Dual-core CPU or Higher
    b. Hard Disk: Minimum 40 GB
    Ram: 512MB or Higher

VI. TOOLS AND TECHNIQUES

A Web Application on **"**Time Table Generator-plan ahead**"** is built up using following techniques:

1. FRONT-END:
    - HTML
    - CSS
    - JavaScript
    - jQuery
2. BACK-END:
    - PHP
3. DATABASE:
    - MySQL

VII. IMPLEMENTATION



VIII. CONCLUSION

This approach of solving automated timetable management system is successful in solving universities timetabling problem. The graphical user interface used in this software provides an easy way in understanding how software works and also makes easy in providing the input. This application is provided with important details to generate the timetable with minimum time when compared to manual timetable generation. It solves many constraints like:

- No overlapping of time slots for any faculty
- Separate time table for each batch of faculty

IX. REFERENCES

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