

# Automatic Timetable Generator

<sup>1</sup>Mr. Vadipina Amarnadh, <sup>2</sup>B. Hemanthi, <sup>3</sup>G. Sravanthi, <sup>4</sup>S. Sai Sanketh

<sup>1</sup>Assistant Professor, <sup>2,3,4</sup>B.Tech Student

<sup>1,2,3,4</sup>Department of CSE

<sup>1,2,3,4</sup>Anurag Group of Institutions, Venkatapur, Ghatkesar, Hyderabad, Telangana 500038

Email: <sup>1</sup>[amarnadh@cvsr.ac.in](mailto:amarnadh@cvsr.ac.in), <sup>2</sup>[16h61a05c6@cvsr.ac.in](mailto:16h61a05c6@cvsr.ac.in), <sup>3</sup>[16h61a05e1@cvsr.ac.in](mailto:16h61a05e1@cvsr.ac.in), <sup>4</sup>[16h61a05g8@cvsr.ac.in](mailto:16h61a05g8@cvsr.ac.in)

**Abstract** - The manual system of preparing time table in colleges with large number of students is very time consuming and usually ends up with various classes clashing either at same room or with same teachers having more than one class at a time. Due to all the manual maintenance, there are number of difficulties and drawbacks that exist in this system. The Organization is not able to achieve its need in time and the results too may not be accurate. These are just due to common human errors which are very difficult to prevent in processes such as these. To overcome all these problems we propose to make an automated system. The Automatic Timetable Generator system will take various inputs like details of faculty, students, subjects and depending upon these inputs it will generate a possible time table, making optimal utilization of all resources in a way that will best suit the specified constraints or college rules. Automatic Timetable Generator system is an automated system which generates time table according to the data given by the user. The main requirement of the application is to provide the details about the branch, semester, subjects, labs and total no. of periods. List of subjects may include electives as well as core subjects. Students need to elect their electives if any. Then the application generates the time table according to your need.

**Index Terms** – Timetable, Constraints, Timeslots.

## I. INTRODUCTION

Technology makes lifestyle easier by providing better support to different systems, better accuracy, better security options, easier maintenance, etc. Now a day's technology eventually means "computers" which is the greatest achievements of last century. Day by day computers are being more and more popular because of its features like ease of work, ease of learning, greater accuracy with the least time consumption and the last but not the least i.e. ease of maintenance with cost effectiveness. So as a part of these ongoing evolutionary approach traditional systems are being computerized to make them more fruitful than ever.

Timetable is a very important part of the college management system. It helps the college management to maintain the discipline in the college premises. Timetabling concerns all activities with regard to producing a schedule that must be subjective to different constraints. A key factor in running an educational center or basically an academic environment is the need for a well-planned and clash-free timetable. Back in the days when technology was not in wide use, timetables were manually created by the academic institution. Every institution is faced with the tedious task of drawing up academic timetables. Therefore there is a great requirement for an application distributing the course evenly and without collisions. Our aim here is to develop a simple, easily understandable, efficient and portable application, which could automatically generate good quality timetables within seconds.

## II. LITERATURE SURVEY

### 1. Automated timetable generation using multiple context reasoning for university models.

Author: Dipti Srinivasan, Tian Hou Seow, Jian Xin Xu

"Dipti Srinivasan, Tian Hou Seow and Jian Xin Xu" 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.

### 2. University Time Table Scheduling using Genetic Artificial Immune Network.

Author: Antariksha Bhaduri

Antariksha Bhaduri 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.

### 3. A mimetic algorithm for university course timetabling problem.

Author: Sadaf N. Jat, Shengxiang Yang

“Shengxiang Yang, Member, IEEE, and Sadaf Naseem Jat” 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

Oxford dictionary defined timetables as;

- A plan of times at which events are scheduled to take place, especially towards a particular end.
- A chart showing how the weekly time of a school or college is allotted to classes.

Wikipedia also gave a definition as;

A school timetable is a table for coordinating these four elements:

- Teachers
- Students
- Subjects
- Time slots or Periods

### III. EXISTING SYSTEM

In the existing system, each task is carried out manually and processing is a very tedious job. The Organization is not able to achieve its need in time and the results too may not be accurate. Due to all the manual maintenance, there are number of difficulties and drawbacks that exist in this system.

#### Disadvantages of the existing System:

- Done manually
- Increases paper work
- High chances of errors
- Time taking process

### IV. PROPOSED SYSTEM

The proposed system “Automatic Timetable Generator” is designed to be more efficient than the actual manual system. It invokes all base tasks that are now carried out manually. The final system should be able to generate time tables in a complete automated way which will save a lot of time and effort of an institute administration. Ease of use for user of system so that he/she can make automatic time table. It focuses on optimization of resources i.e. teachers, labs and elective subjects etc. This system provides a facility for everyone to view timetable and it generates multiple useful views from created time table.

#### Description:

- Most colleges have a number of different courses and each course has ‘n’ number of subjects.
- Now there are limited faculties, and each faculty might be teaching more than one subjects.
- So now the time table needed to schedule the entire faculty at provided time slots in such a way that their timings do not overlap.
- We use a customized algorithm for this purpose.

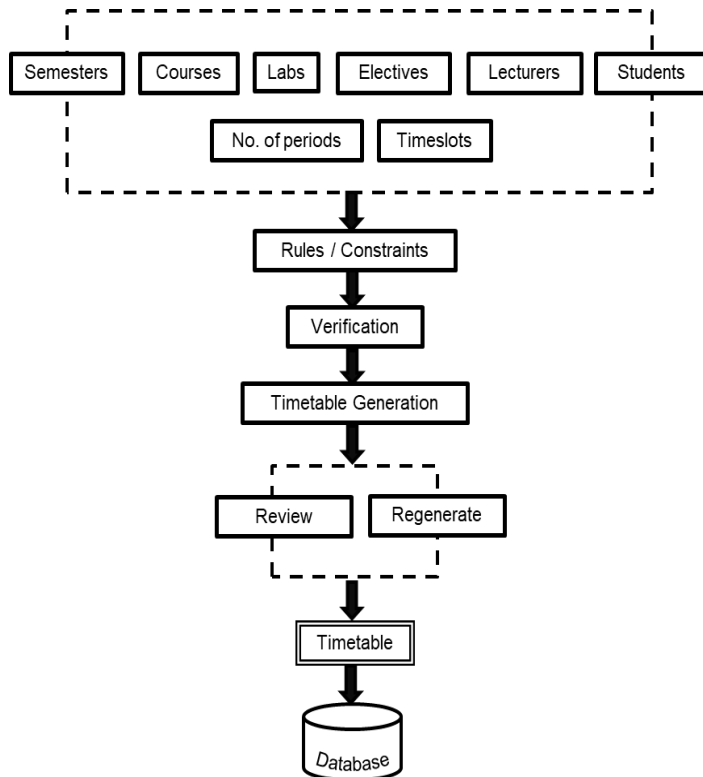


Fig 1: System Architecture

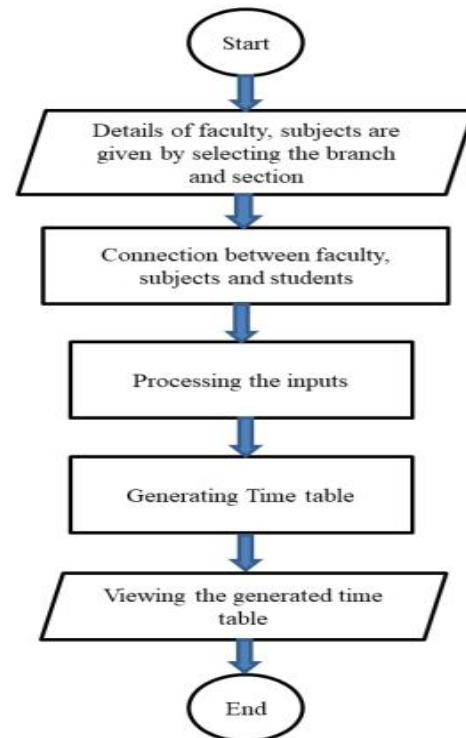


Fig 2: Flow Chart diagram

Advantage of Proposed System:

- Easier slot assigning.
- Less time consumption.
- NO slot clashes.
- Always considers the other department slots first.
- Various possible slot combinations can be acquired.
- User friendly.

V. IMPLEMENTATION

A. Insertion module:

In this module we provide various user inputs to our system which acts raw data for creating the final time table.

1. Faculty details: In this sub module various details of faculty are inserted such as faculty name, email and contact number. And we also provide a unique faculty id which helps in referencing throughout our software and it also acts a login credentials.
2. Student details: In this sub module various details of student are inserted such as student name, email and contact number. And we also provide a unique student id which helps in referencing throughout our software and it also acts a login credentials.

3. Subject details: In this sub module details of subjects are inserted that are in our curriculum such as subject name and subject code. We try to store the theory subjects and lab subjects separately. The type of subject (compulsory or elective) is also specified for each subject in our database so that it becomes easy for us in future use.
4. Add No. of periods: To generate timetable for a particular semester and section first the timeslots need to be specified for each week day. Here you need to again specify whether that period is allocated for lab or for theory.
5. Mapping: In this sub module we take user input such as what are all the subjects that are present in each semester for each section and which faculty is taking which theory subjects and which lab in a particular semester and we store it our database.

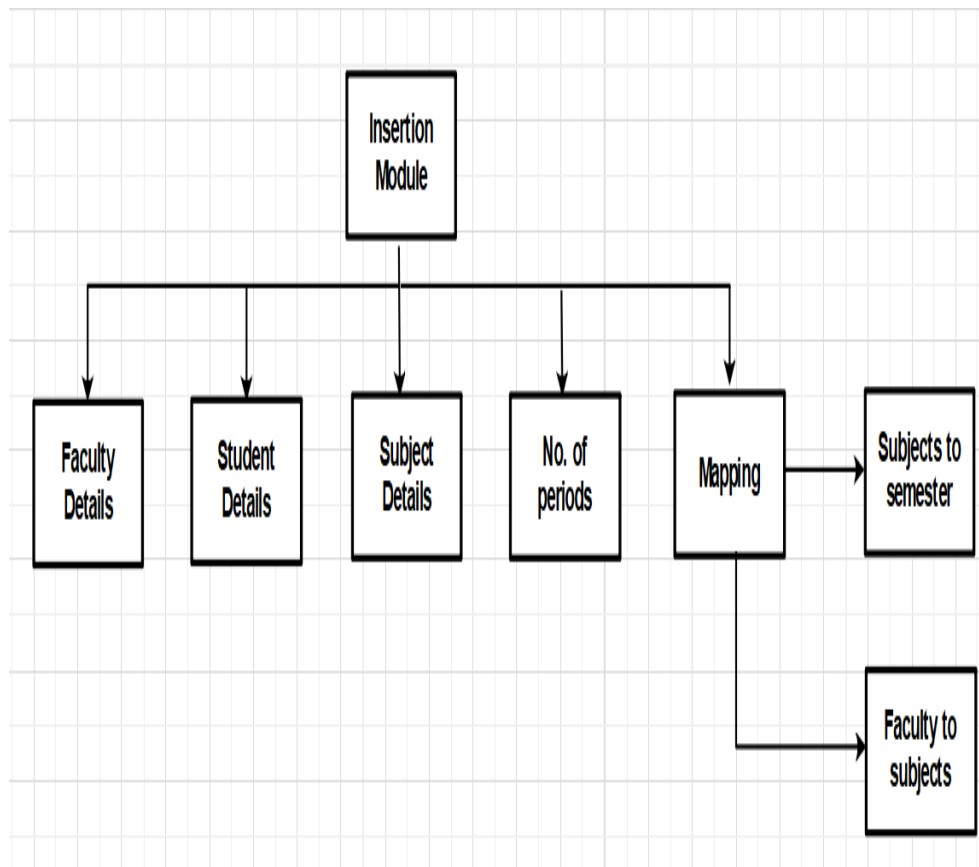


Fig 3: Insertion Module

#### B. Allocation module:

In this module, user can choose any semester randomly to start the process. It starts filling the slots from the Monday by selecting a particular subject, faculty that is mapped with that subject gets allotted to that slot of the day. The various constraints are checked every time the slot is filled. It will not be blocked if any of the constraints is not satisfying.

#### The given set of constraints need to be satisfied:

- A classroom is not assigned to more than one teacher at the same time.
- A teacher cannot teach more than one class at the same time.
- A teacher cannot teach more than three subjects in a day for a single class.
- During the lab hours particular lecturers should not be allotted with the theory class.
- A faculty is assigned maximum of 4 lectures in a day OR maximum of 1 practical session and of 2 theoretical sessions in a day.

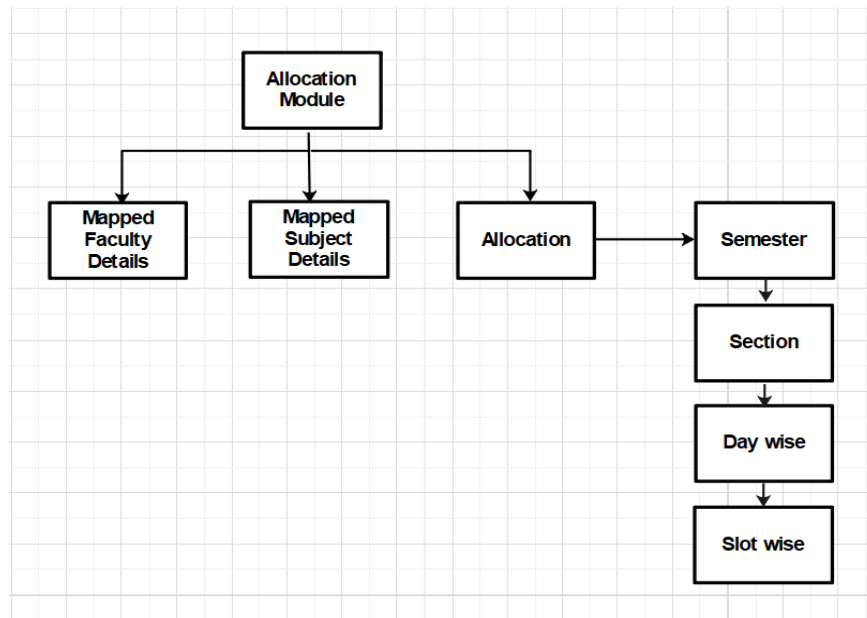


Fig 4: Allocation Module

### C. Display Module:

In this module we can view how the time table is generated of each class. We have also provided the feature to view the class time table.

1. View timetable: In this we can view the class wise generated time table by selecting the particular semester and section which we want to see. The time table will have subject with faculty who handling that subject.
2. View Faculty: All the faculty details can be viewed.
3. View students: All the student details can be viewed.

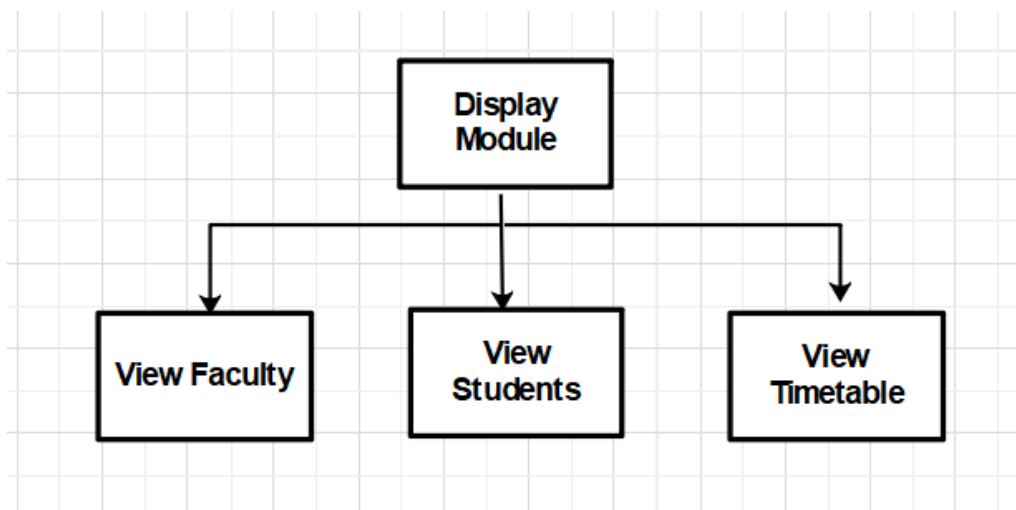
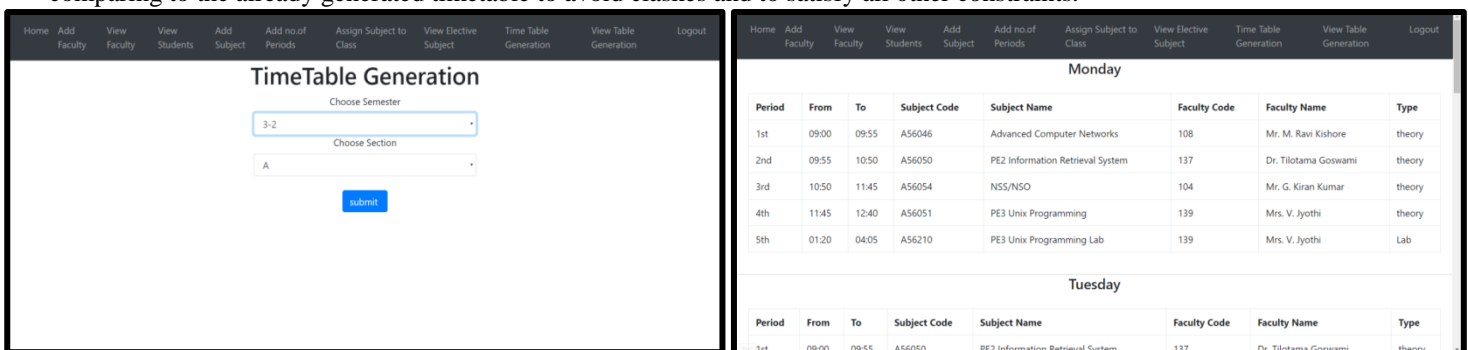


Fig 5: Display Module

**Description:**

1. The admin can add the HOD and can also view HOD, faculty, and student details which are already been added.
2. The HOD can add the faculty and can view the faculty members and students who have been already added. He can add what are all the subjects that are present in that department along with the subject type whether it's a theory subject or lab subject. After that he can assign those subjects which are added to the whole department, for each semester and section. Here while assigning, the category of each subject to that semester need to be specified whether it is a compulsory or elective subject. Now the numbers of periods can be added. All the elective subjects of that semester can be viewed for that semester students to elect their electives and further the HOD can view how many students has opted for which subject (acceptance count of each elective subject in each semester and section can be viewed) and he can approve it.
3. Here for generating the timetable, each faculty needs to get logged in and give the details of the subjects which they teach. On selecting the semester and section the faculty can see what are all the subjects that are available in that semester to be taught by him which are not yet added by any of the faculty to that particular class in that semester.
4. If the faculty selects one subject to teach for a particular class in a semester, that subject will not be seen again in that list to be added by that faculty or by any other faculty member as it's already been added for that section in that semester. As a subject can be taught by only one faculty member for a particular class that subject will not be seen for any other faculty or even for that faculty in the list to add it again.
5. Finally the HOD can generate the timetable now for a particular section in a semester.
6. Basically to start the process of generating timetables for all the section in all semester and departments first we need to generate a timetable for a section in a semester randomly and submit it. Based on this sections' timetable the other timetables can be generated comparing to the already generated timetable to avoid clashes and to satisfy all other constraints.



Monday							
Period	From	To	Subject Code	Subject Name	Faculty Code	Faculty Name	Type
1st	09:00	09:55	A56046	Advanced Computer Networks	108	Mr. M. Ravi Kishore	theory
2nd	09:55	10:50	A56050	PE2 Information Retrieval System	137	Dr. Tilotama Goswami	theory
3rd	10:50	11:45	A56054	NS5/NSO	104	Mr. G. Kiran Kumar	theory
4th	11:45	12:40	A56051	PE3 Unix Programming	139	Mrs. V. Jyothi	theory
5th	01:20	04:05	A56210	PE3 Unix Programming Lab	139	Mrs. V. Jyothi	Lab

Tuesday							
Period	From	To	Subject Code	Subject Name	Faculty Code	Faculty Name	Type
1st	09:00	09:55	A56050	PE2 Information Retrieval System	137	Dr. Tilotama Goswami	theory

**Fig 6: Timetable Generation****VI. CONCLUSION**

The Automatic Timetable Generator is a web based system. Its basic function is to generate the time table according to the data filled. This application will simplify the process of time table generation smoothly 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 project is developed in such a way that, no slot clashes occur providing features to tailor the timetable as of wish. Separate timetable for the individual class are generated automatically by this system. Various slot combinations can be acquired so that another timetable is generated as of need. The project reduces time consumption and the pain in framing the timetable manually.

The future enhancement that can be developed from the project may include Leave Management, Exam Schedule Generation, Exam Room Scheduling and Time Constrain Problems. This enhancement can be achieved my making further modifications keeping the approach and techniques used for this project.

**VII. REFERENCES**

[1] D. Srinivasan, Tian Hou Seow, Jian Xin Xu, "Automated time table generation using multiple context reasoning for university modules", Proceedings of the 2002 Congress on Evolutionary Computation. CEC'02 (Cat. No.02TH8600) published by IEEE in 07 August 2002

[2] Adithya R Pai, Ashwitha S, Raksha Shetty, Prof. Geethalaxmi, "Automatic timetable generator", International Journal of Computer Engineering and Applications, Volume XII, Issue II, www.ijcea.com ISSN 2321-3469, Feb. 18

- [3] Sundresan Al Perumal, Mujahid Tabassum, Norita Md Norwawi, Ganthan Al Narayana Samy, “Development of an Efficient Timetable System”, 8th IEEE International Conference on Control System, Computing and Engineering (ICCSCE) - Nov 2018
- [4] Bhaduri a “University timetable scheduling using genetic algorithm”. Advances in Recent Technologies in Communication and Computing, 2009. ARTCom '09. International Conference.
- [5] Dipti Shrinivasan “Automated time table generation using multiple context reasoning for university modules” Published in: evolutionary computation, 2002. cec '02. proceedings of the 2002 congress on (volume:2).
- [6] Simon Robinson, Christian Nagel, Jay Glynn, Morgan Skinner, Karli Watson, Bill Evjen “Professional C#”, 3rd Edition, Wiley Publishing, Inc 2004
- [7] Silberschatz, H. Korth and S. Sudarshan, “Database System Concepts”, A Timetable Prediction For Technical Educational System Using Genetic Algorithm, 4th Edition, McGraw-Hill International, 2002
- [8] V. Abhinaya, K. Sahithi, K. Akaanksha, “Online Application of Automatic Time-Table Generator”, International Research Journal of Engineering and Technology (IRJET), Volume: 06 Issue: 02, Feb 2019
- [9] Anuja Chowdhary, Priyanka Kakde, Shruti Dhoke, Sonali Ingle, Rupal Rushiya, Dinesh Gawande, “TIMETABLE GENERATION SYSTEM”, International Journal of Computer Science and Mobile Computing (IJCSMC), Vol. 3, Issue. 2, February 2014
- [10] Deeksha C S, A Kavya Reddy, Nagambika A, Akash Castelino, K Panimozhi, “Automatic Timetable Generation System”, Journal of Emerging Technologies and Innovative Research (JETIR), Volume 2, Issue 4, April 2015.