JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

"Automatic Timetable Generation Using Genetics Algorithm"

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Abstract: ***The manual system of preparing a timetable in an educational organization with a large number of students is very time-consuming and usually ends up with various classes clashing either in the same room or with the same teachers having more than one class at a time. To overcome all these problems we propose to make an automated system. This system will take various inputs like details of subjects, teachers, availability of classrooms, depending upon these inputs it will generate a possible timetable, making optimal utilization of all resources in a way that will best suit any of constraints or college rules. The scheduling solution presented here is an adaptive one, with a primary aim to solve the issue of clashes of lectures and subjects pertaining to teachers.***

IndexTerms - Genetic algorithm, Timetable Scheduling, Constraints.

I. INTRODUCTION

Timetable scheduling is the process of creating timetables that fits the requirements of the organization. It is used in many industries, for example scheduling transportations, in business organizations for distributing workloads, in educational organizations. The majority of the scheduling is done manually.

Time table scheduling is a human requirement for managing time effectively. It is widely used in different fields like schools, colleges for teaching and working. The main factor in running an educational institute is the need for a well-planned and clash-free timetable. Timetables are created manually which is a very tedious job, Nowadays there are some softwares available that help in creating timetables automatically but they have some drawbacks. To overcome these problems people usually modify the previous year's timetable but still, it is very tedious work to accomplish.

A lot of efforts have been made in the earlier period to overcome the complexity of generating timetables for schools and colleges. Here, we are proposing a realistic timetable algorithm that can rectify all the problems and can take care of both hard and soft constraints. Through our research, all the difficulties faced while working with timetables manually can be overcome and it provides a complete solution for all the issues. Though it is difficult to create a worldwide agenda that suits all constraints, it is an overwhelmed process that is large and forcible. However, throughout the world, people prefer manual creation of time-table because of the lack of suitable computer programs.

II. PROBLEM STATEMENT

In the existing system, timetable generation is carried out manually and processing is very slow. The Organizations are not able to achieve its need in time and the results too may not be accurate. Due to all the manual maintenance, several difficulties and drawbacks exist in the current system. Considering the workload of staff it will make the scheduling part of the timetable more complex.

III. PROPOSED SYSTEM

The proposed system was developed to solve the timetable generation problem being faced by educational organizations.
The system has capabilities for the input of the various courses, departments, faculties, room numbers, and the specification of a few constraints from which the timetable is constructed. The proposed system seeks to generate a maximum error-free timetable using the principles of the genetics algorithm.

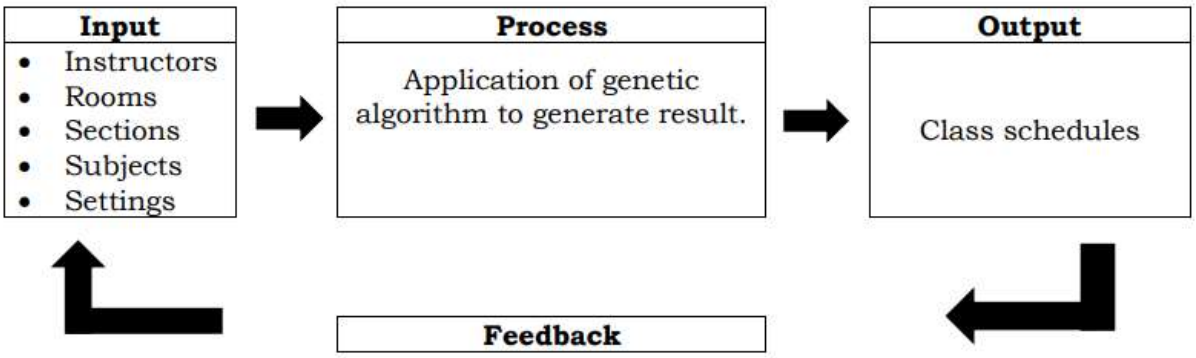

Figure 1: Program Model

IV. WHAT IS GENETIC ALGORITHM?

- A Genetic algorithm is a set of instructions that is repeated to solve a problem.
- It works by building a population of chromosomes which is a set of possible solutions to the optimization problem. [7]
- It uses the principle of natural selection to drive a set of solutions until an optimal solution is obtained
- It is inspired by natural evolution like mutation, inheritance, crossover, and selection which are also known as evolutionary algorithms
- Multiple operations like Initialization, Selection, Variation, Crossover, Mutation, and Evolution are performed on a population of a possible candidate solution. [7]
- The result will keep on getting optimized every generation that represents its candidate solutions as strings of genes called chromosomes
- It uses Survival of Fittest theory: most fitness will inherit into the next generation.

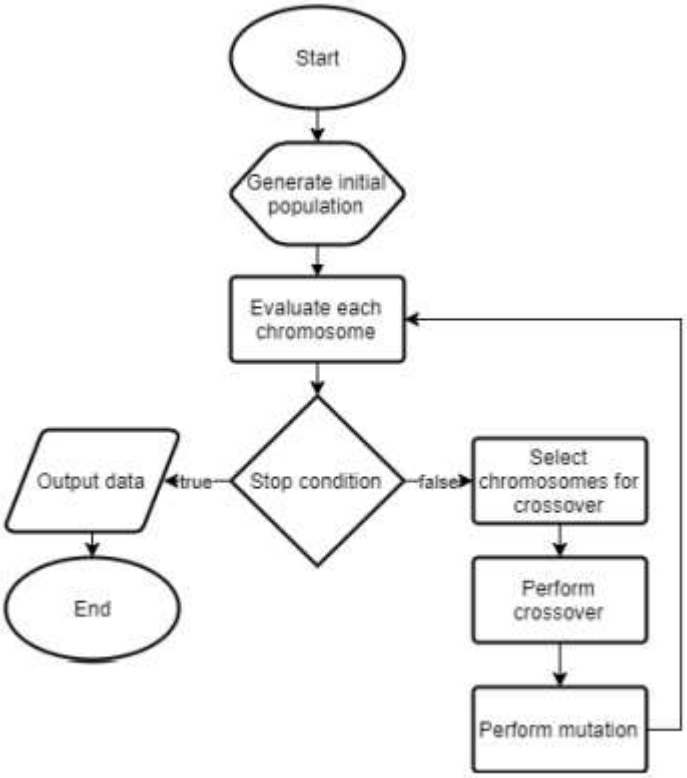

Figure 2: Basic Genetic Algorithm process [19]

V. FEATURES

- Load Balancing: Since the system will currently be available only for admin login the amount of load on the server will be limited for the period time of admin access.
- Easy Accessibility: Records can be easily accessed and stored (i.e. Historical Data Available).
- Efficient and reliable: Maintaining the database on the server which will be accessible according to the user requirement without any maintenance cost will be very efficient as compared to storing the data on a spreadsheet or in physical record books
- User Friendly: A very user-friendly approach for all users.
- Easy maintenance: The design of ATG is easy. So maintenance is also easy.

VI. PROJECT IMPLEMENTATION

In this research, we used Visual Studio code 2020 for the design and coding of the project. Created and maintained all databases into Sqlite3, in that we create tables, write the query to store data.

- Hardware Requirement:
  2.0+ GHz with multithreading support.
  2 GB-RAM minimum.
  Hard Disk space as per requirements.

- Software Requirement:
  Windows 7 or higher.
  Visual Studio Code 2018 or higher
  DB Sqlite3.

VII. CONCLUSION.

It is a complicated task to handle many teachers and allocate subjects for them at a time physically. So our proposed system will help to overcome this problem. This system will make the procedure of generating timetable easier consistently which may otherwise need to be done using a spreadsheet or excel manually which might lead to constraints problems that are difficult to establish when time table is generated physically. This system is user-friendly and provides a faster and better generation of timetables, which in turn saves a lot of precious time and manpower for coordinators who are involved in creating and managing timetables.

VIII. REFERENCES

[1] Kalyani R. Rade, Kajal R. Dhende, Prof. M. R. Rokade, "Automated Timetable Generator", at International Journal for Scientific Research & Development (IJSRD) Vol. 7, Issue 11, 2020, ISSN (online): 2321-0613.

[2] Shraddha Thakare, Tejal Nikam, Prof. Mamta Patil, "Automated Timetable Generation using Genetic Algorithm ", at International Journal of Engineering Research & Technology (IJERT) Vol. 9, Issue 07, July-2020, ISSN: 2278-0181.

[3] Ramesh, K.S.Guruprakash, N.Atchaya, P.Kanimozhi, M.Kaviya, R.Nirmaladevi, "Automated Timetable Generator Using Time Scheduling Algorithm", atInternational Journal of Advanced science and Technology, Vol. 29, No. 7, (2020), pp. 2159-2164.

[4] Mr.Mallikarjuna Nandi, Ms.R.Priyadharshini, Ms.R.Aishwarya and Ms.M.Nandhini, "Automatic Time Table Generator", at PAIDEMUA Journal (0090-5674), Vol 12, Issue 1, 2019

[5] V. Abhinaya, K. Sahithi, K. Akaanksha, "Online Application of Automatic Time-Table Generator", at International Research Journal of Engineering and Technology (IRJET) (e-ISSN: 2395-0056, p-ISSN: 2395-0072) Volume 06, Issue 02, Feb 2019.

[6] Adithya R Pai, Ashwitha S, Raksha Shetty, Prof. Geethalaxmi, "Automated college timetable generator", at International Journal of Scientific & Engineering Research (IJSER)Volume 9, Issue 4, April-2018, ISSN 2229-5518.

[7] Shraddha Shinde, Saraswati Gurav, Sneha karme, "Automatic Timetable Generator using Genetic Algorithm", at IJSER (International Journal of Scientific & Engineering Research) (2229-5518) Volume 9, Issue 4, April-2018.

[8] Yash Lahoti, Aaditya Punekar, Hiten Patel, Vishal Bhimsariya, "Automated Timetable Generator", at IJSR (International Journal of Science and Research) (2319-7064) Vol-6, Issue 1, January 2017.

[9] Sweety G. Rangari, Vrushali K. Kadam, Prof. Pooman A. Manjare, "Automatic Timetable Generator System", at IJIR (Imperial Journal of Interdisciplinary Research) (2454-1362) Vol-3, Issue 5, 2017.

[10] Saritha M, Pranav Kiran Vaze, Pradeep, Mahesh N R, "Automatic Time Table Generator", at International Journal of Advanced Research in Computer Science and Software Engineering, Volume 7, Issue 5, May 2017, ISSN: 2277 128X.

[11] A.Venkata Sai Krishna, P.Bala Saravan Teja, P.Yasvanth, M.Sai Ajay, "AUTOMATIC TIMETABLE GENERATION", at International Research Journal in Advanced Engineering and Technology (IRJAET), E - ISSN: 2454-4752 P - ISSN : 2454-4744, VOL 3 ISSUE 5 (2017).

[12] Deeksha C S, A Kavya Reddy, Nagambika A, Akash Castelino, K Panimozhi, "Automatic Timetable Generation System", atJournal of Emerging Technologies and Innovative Research (JETIR), Volume 2, Issue 4, April 2015, ISSN-2349-5162.

[13] Shabina Sayed, Ansari Ahmed, Ansari Aamir, Ansari Zaeem, "Automated Timetable Generator", at IJIRST (International Journal for Innovative Research in Science & Technology) (2346-6010) Volume 1, Issue 11, April 2015.

[14] Anuja Chowdhary, Priyanka Kakde, Shruti Dhoke, Sonali Ingle, Rupal Rushiya, Dinesh Gawande, "TIMETABLE GENERATION SYSTEM", at International Journal of Computer Science and Mobile Computing (IJCSMC), Vol. 3, Issue. 2, February 2014.

[15] Mugdha Kishor Patil, Rakhe Shruti Subodh, Prachi Ashok Pawar and Naveena Narendrasingh, "Web Application for Automatic Time Table Generation", at International Journal of Current Engineering and Technology (2347-5161) Vol.4, No.3, June 2014.

[16] Anirudha Nanda, Manisha P. Pai, and Abhijeet Gole "An Algorithm to Automatically Generate Schedule for School Lectures Using a Heuristic Approach", atInternational Journal of Machine Learning and Computing, Vol. 2, No. 4, August 2012.

[17] https://www.geeksforgeeks.org/django-tutorial/

[18] https://www.geeksforgeeks.org/introduction-to-visual-studio/

[19] http://mde.tw/wcm2021/downloads/2018_UNIVERSITY%20TIMETABLE%20SCHEDULING%20USING%20METAHEURISTIC%20ADAPTIVE-ELITIST%20GENETIC%20ALGORITHM.pdf