**DEVELOPMENT OF GENETIC-BASED CULTURAL ALGORITHM FOR SCHOOL TIME TABLE SCHEDULLING PROBLEM**

**BY**

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**CHAPTER ONE**

**INTRODUCTION**

* 1. **PREAMBLE**

The school time table is the time-table that supplies the framework within which the work of the school proceeds. It is the instrument through which the purpose of the school is to function. The school time-table is said to be the heart process of school administration. To make the teaching and learning process effective and useful, the school has to be provided with a suitable time-table keeping in view the needs of the pupils and teachers. The time-table acts as a preamble to the smooth running of the school administration. The need and significance of the time-table is elucidated as below: Ensures orderly work, ensures integral economy and regularity, ensures proper distribution of work-load, promotes discipline, regular and uniform progress, ensures arrangement and proportion, second school clock, ensures adjustment, reflects the philosophy of the School.

The time-table is a mirror that reflects the entire educational programme of a school. This is also known as “Second School Clock” which guides the functioning of the institutional work in a proper and organized manner. A school timetable is a table for coordinating these four elements: students, teachers, rooms, time slots (also called periods). There should be variety (attention fixing divide) in the time-table both for the teacher and the taught. The following precautions may be helpful in this connection, change of room and posture which helps to reduce the incidence of tiredness. As far as possible no class should sit in the same room for the whole day, no consecutive periods, no class should be fixed the same subject for two consecutive periods except the subjects with more unit, variation in teachers is also essential, no two consecutive periods should be given by the same teacher to a particular class. In order to avoid boredom the variation in subjects should be provided. Easy and difficult subjects should be provided alternatively. For instance, in between English and Mathematics, may be introduced. This provision may be applied to teachers also. A teacher of English and chemistry should get these subjects alternatively. Another teacher who is for Mathematics only may get classes in lower and higher classes alternatively. Language teachers may get classes on oral and written lessons alternatively. The time-table should accommodate a few periods for play and recreation. Recess period should be not more than 30 minutes, in which the students may just play after taking the Tiffin. Play and other recreations activities are the sources of pleasure and enjoyment. The time-table is the index to show the equitable distribution of such work-load. Free periods for the teachers should be provided so as to increase their efficiency and also for correctional works. Free periods should be scattered over all the days of the week. It is not wise to allot all the free periods in a particular day of the week. It is suggested that a teacher will be allotted at least Three Free Periods a day. This will enable him to take rest, to correct the home-work and to prepare him for the class.

The time-table should be based on the rules & regulations as prescribed by the education department. While framing time table, it should be kept in mind whether it is fit for fulfillment of needs. It can pave the way for overall development of students. We should not have the same time table for whole of the session. The time table meant for harmattan section should be kept different from meant for rain. It also depends upon the geography which directly affects the weather of that area like hilly area will have different time table than planes.

Cultural algorithms (CA) are a branch of evolutionary computation where there is a knowledge component that is called the belief space in addition to the population component. In this sense cultural algorithms can be seen as an extension to a conventional genetic algorithm. The belief space of a cultural algorithm is divided into distinct categories which represent different domains of knowledge that the population has of the search space. The belief space is updated after each iteration by the best individuals of the population; the best individuals can be selected using fitness function that assesses the performance of each individual in population much like in genetic algorithms.

Genetic algorithms are a representative of evolutionary algorithms and population based heuristics. They maintain a population of solution and combine them using evolutionary inspired operators such as mutation and crossover to find a satisfactory solution. The solution space consists of all periods in which each lecturer takes the required number of periods, but the remaining constraints, both hard and soft, are relaxed and penalized in the fitness function.

Results based on software performance metrics will be used to measure the impact of the solution generated. The talk will conclude with some observations as to the overall quality of this approach to this and similar problems. In recent years Genetic algorithms have emerged as a useful tool for the heuristic solution of complex discrete optimization problems. In particular there has been considerable interest in their use in tackling problems arising in the areas of scheduling and timetabling. However, the classical genetic algorithm pattern is not well equipped to handle constraints and successful implementations usually require some sort of modification to enable the search to exploit problem specific knowledge in order to overcome this shortcoming.

* 1. **PROBLEM STATEMENT**

The need to create time table is very essential in school, time tables are made manually which makes generating it stressful and takes very long time to generate. Also creating may be biased, the person making the time table will like to favor his or herself or favoring a close colleague. Time table made are prone to errors like time clashes in schedule where-by a lecturer might be in class at the same time, the same day but different class entirely.

This project is intended to create a school time table using a genetic-based cultural algorithm to remove some of the above limitation, the platform removes biased schedules, time clashes, time wastage and encourages an easy way of making time tables.

**1.3 AIM AND OBJECTIVES**

The aim of this project is to develop a genetic-based cultural algorithm in

Order to solve time table problem. To achieve the above aim, the following

Objectives will be pursued:

* To implement a genetic-based cultural algorithm.
* To create an effective time table for students.
* To evaluate the performance of the developed system based on software complexity metrics such as: Time complexity, Maintainability index, Computation complexity.

**1.4 SCOPE OF THE STUDY** These guidelines are applicable to all student in areas where time table are used to manage and support the delivery of lecture within the department of Mechanical Engineering Faculty of Engineering and Technology, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria.