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# Load Distribution and Time Table Generation Software

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Abstract: In institutions with a lot of students, the manual timetable preparation method takes a long time and frequently results in different classes conflicting in the same room or with the same teachers teaching multiple sessions at once. This are just the result of frequent human error, which is exceedingly challenging to avoid in procedures like this. People typically adapt the previous year's schedule to get around these issues, but it is still labour-intensive to implement such changes.

Our suggestion is to create an automated system in order to solve all of these issues. The system will receive multiple inputs, such as student, subject, class room, and teacher details; based on these inputs, it will produce a potential time. Keywords: Timetable, Automatic, Academic, Load distribution.

### I. INTRODUCTION

Humans have needed timetable scheduling ever since they learned how to efficiently manage their time. It is extensively utilized in universities, colleges, and other educational and professional settings, including training programs, couching centres, and crash courses. Timetable scheduling used to be done manually by one person or by a group of people who took a lot of time and effort to schedule the timetable by hand. Even the smallest limitations can be difficult to schedule, and the situation gets worse when there are more constraints or data to process.

In these scenarios, a well-designed timetable is used for an entire generation without any modifications, which proves to be boring. Other situations that may give rise to issues include low employer and worker numbers, which may force a rescheduling of the schedule or the immediate requirement to fill open seats. Organizations such as schools, colleges, universities, and institutions frequently adopt these schedules. They must plan their course to accommodate the present length of time and the facilities at their disposal. They should, however, adjust their schedule to accommodate freshly enrolled students in new batches and new course additions. This might mean changing the entire timetable for all of the batches and scheduling it to begin as soon as feasible before the batches' courses begin.

An additional issue that arises while establishing exam schedules. Exam schedules for batches taking tests on the same day must be carefully planned, accounting for any issues pertaining to the facilities needed to administer the exams concurrently.

### II. LITERATURE REVIEW

Trying to develop a software which helps to generate Timetable for an Institution automatically. By looking at the existing system we can understand that timetable generation is done manually. Manually adjust the timetable when any of the faculty is absent, and this is the big challenge for Automatic Timetable Generator that managing the timetable automatically when any of the faculty is absent.

It will not be difficult to manage and maintain these since, as we all know, each institution or organization has its own schedule. This scheduling will become more complicated as workload is taken into account. As previously stated, the maximum and minimum workload that is typical for a college should be taken into account while creating a schedule. In those situations, creating a schedule will become more difficult. It takes a lot of time to complete as well.

Mei Rui [1] In this paper, through the analysis and the summarization of the existing problems, a mathematical model for the course timetable system is proposed. At the same time, through the use of the pattern recognition technology in artificial intelligence, aiming at this mathematical model a new university course timetable system design program is proposed and realized. This program not only can well solve the shortages of the existing course timetable system, but also is simple and easy to operate, has strong versatility.

Bhaduri A [2] 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.



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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. Dipti Shrinivasan [3] 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 solving 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. The comprehensive course timetabling system presented in this paper has been validated, tested and discussed using real world data from a large university.

Dipti Srinivasan, Tian Hou Seow, Jian Xin Xu [4] "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.

W. F. Mahmudy and R. E. Febrita (2017) [5], Use fuzzy logic to create and carry out timetable scheduling that incorporates multiple genetic operators. The constraints are resolved using fuzzy logic, a multivalent logic. This is derived from fuzzy set theory and is used to replace exact reasoning with approximative reasoning. The proportion of truth of a statement may vary between 0 and 1, depending on the membership values of formal fuzzy logic variables, which may not always be 0 or 1. Fuzzy logic is not limited to two value reasoning, in contrast to classical logic. Results show that this method can be used to maximize difficult scheduling objectives and produce outcomes that are realistic.



III. METHODOLOGY

Fig.1 Flowchart Diagram

The general operation of the Load Distribution and Time Table Generation Software System is explained in the flow chart above. It comprises input information on the teacher, subject data, and both soft and hard constraints. An ideal timetable will be produced by the system utilizing this information collection. The system has a login page first. To access the Home Page, which offers details on the Load Distribution and Time Table Generation Software System, the user must first check in with a valid user ID and password. Additionally, there are different link tabs on the menu bar that allow you to travel to different pages, but they are only functional when the user is logged into the system.



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After logging in, the user will be granted permission to access the following page, which is for adding subjects. On this page, the user will be requested to provide the subject name, timings, and other pertinent information. The user's entry of subject-related data will be mirrored and stored in the database. The user must enter the faculty information, such as the faculty name, which faculty will be taking which subject, whether it will be a theory session or a practical, etc., on the next page after the system has obtained the subject detail. Additionally, these particulars will be added to our dataset. The system currently contains all subject, teacher, and other associated data.

Following the user's click of the "generate" button on the system, all of the data inputs will be saved and gathered into our dataset. The Load Distribution and Time Table Generation System will then utilize all of the constraints and information to create an optimized timetable in an Excel sheet, which the user can download to their device.

### IV. PROPOSE SYSTEM

The "Load Distribution and Time Table Generation Software" system under consideration is intended to outperform the current manual system in terms of efficiency. It initiates all base tasks that are currently completed by hand. The finished system should be able to create timetables entirely automatically, saving institute administrators a great deal of time and work. User-friendliness of the technology to enable automatic creation of timetables. It emphasizes on making the most use of available resources, such as instructors, labs, and elective courses. This method makes it possible for anybody to view the timetable and creates a number of helpful perspectives from it.

- 1) The majority of colleges provide several distinct courses, with each course consisting of "n" subjects.
- 2) There are now few faculties, and each faculty member may teach multiple disciplines.
- 3) The timetable now needed to arrange for all of the faculty members to work within the allotted times in a way that prevents scheduling conflicts.
- 4) For this, a specially designed algorithm is employed.

Advantage of Proposed System:

- Easier slot assigning.
- Less time consumption.
- NO slot clashes.
- Various possible slot combinations can be acquired.
- User friendly.



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1) Login Page: Admin can login the page with their Id & Password. If the password is wrong the system will show the invalid password.

0	Load Distr	Ibution And Time 1	able Generation	1		
		feacher Name	Add Teacher			
Menu						Add New
Teachers	Territoria	eacher Name is required				Delute
	Tracher IS	Male				
Subjects		Female			011	Delete
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Batches	5	zualification				-
Lood					on	Devete
	6	Sign in			e a	Delete
Generate Time Table	7				611	Delete
	8				ent	Delete
		ARD	м	MSC CSE	_	
	0.000				ECIT	Desete
	10	SSC	м	PHD	Freit	Delete

2) Faculty Details: Teachers add their name, gender, qualifications and other details.

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Teachers	5ubject Name is required			Subject Name is n	equired		Delete
Subjects	Is Theory			Is Practical			Delete
Batches	No			No			Delete
Load	Teacher						Delete
Generate Time able	Teacher Name is required						Delete
	SOT						Delete
	BUSINESS ENGLISH	TY	faise	true	0	rdit	Delete
_	N	BE	true	true	3	Edit	Delete

3) Subject Details: Teacher add their teaching subjects, their practical batches and class.

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$\bigcirc$	Load Distri	bution And Time	Table Genera	tion	
lenu	Teacher Name	subject Name	Edcation Year	Regired Hours For Theory	Required Hours For Practicle
Teachers	NHS	IOT	TΥ	2	
Subjects	RDM	JS	тү	3	2
Batches	RDM	N	86	3	2
	PVK	WT	BE	3	2
Load	PVK	AVAL	TY	3	2
Generate Time able	DAN	CA	TY	4	
	РҮК	BUSINESS ENGLISH	тү		2
	РҮК	SOFT SKILLS	SY		2
					New York



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4) System will distribute the load of teachers according to their lectures and practical batches.

enu							Add Ne
Teachers	Subject Name	Edu Year	is Theory	Is Practicle	Required Hours For Theory	Edit	Delete
Subjects	CN	SY	truc	true	3	Edit	Delete
Batches	ют	TY	true	false	2	Edit	Delete
	SP	TY	false	true	3	Edit	Delete
oad	25	TY	true	true	3	Edit	Delete
Senerate Time ble	AVAL	TY	true	true	3	Edit	Delete
	CA	TY	true	false	4	Edit	Delete
	DUSINESS ENGLISH	TY	false	true	0	Edit	Delete
	A	86	true	true	3		Delate

5) Here admin can add, delete or edit the subjects, lectures or practical batches.

Type 1 Type 2 Type 3 Save PDF

lenu				Add I
Teachers	Batch Id	Batch Name	Education Year	
Subjects	38	01	0C	
	39	02	DE	
Batches	40	83	BE	
	32	81	SY	
Load	33	82	SY	
	34	\$3	SY	
Senerate Time ible	35	71	TY	
	36	τ2	τy	
	37	тэ	TY	

6) Add practical batches.

	SY										
Slot Name	Monday	Tuesday	Wednesday	Thursday	Friday	Satureday					
9-10	S1 SOFT SKILLS - SOFT SKILLS - PYK (Room_P1) S2 MP - MP - SAN (Room_P2) S3 CN - CN - ARD (Room_P3)	MP - SAN (Room_Th1 )	AM - DBU (Room_Th1 )	MP - SAN (Room_Th1 )							
10-11	S1 SOFT SKILLS - SOFT SKILLS - PYK (Room_P1) S2 MP - MP - SAN (Room_P2) S3 CN - CN - ARD (Room_P3)	EVS-PAC (Room_Th1)	CN - ARD (Room_Th1 )	EVS - PAC (Room_Th1)							
12-01	AM - DBU (Room_Th2)	DS - SSC (Room_Th2)	CP - SSC (Room_Th2)	DS - SSC (Room_Th2 )							
1-2	CP - SSC (Room_Th2 )	CP - SSC (Room_Th2)	DS - SSC (Room_Th1)	AM - DBU (Room_Th2)							
2-3	S2 SOFT SKILLS - SOFT SKILLS - PYK (Room_P1) S1 MP - MP - SAN (Room_P2) S3 CP - CP - SSC (Room_P3 )	\$3 \$0FT \$KILLS - \$0FT \$KILLS - PYK (Room_P1 ) \$1 CN - CN - ARD (Room_P2 ) \$2 CP - CP - \$\$C (Room_P3 )	S3 MP - MP - SAN (Room_P1 ) S2 CN - CN - ARD (Room_P2 ) S1 CP - CP - SSC (Room_P3 )	CN - ARD (Room_Th2)							
3-4	CN - ARD (Room_Th2)	S3 SOFT SKILLS - SOFT SKILLS - PYK	S3 MP - MP - SAN (Room_P1) S2								

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IsTbs						-	
lue:							Add Wat
N							
	DataSet Visualize	er				E	×
- 1	Filter	- م	Table:	Table2		- Export	t to CSV 💌
	Slot Name	Monday					
	9-10	TI SP - SP - PSA (Roon	P1) T2 J5 - J5	- RDM (Room P2 ) T3 JAV	A - JAVA - PVK (Roo	m P3) T4 B	USINESS ENG
	10-11	T1 SP - SP - PSA (Roon	P1) T2 JS - JS	- RDM (Room P2 ) T3 JAV	A - JAVA - PVK (Roo	m P3) T4 B	USINESS ENG
	12-01	CA - DAN (Room Th1)					
	1-2	IOT - NHS (Room_Th1)					
	1-2	IOT - NHS (Room_Th1) JAVA - PVK (Room_Th2	)				
	1-2 2-3 3-4	IOT - NHS (Room_Th1) JAVA - PVK (Room_Th2 JS - RDM (Room_Th2)	)				
	1-2 2-3 3-4	IOT - NHS (Room_Th1) JAVA - PVK (Room_Th2 J5 - RDM (Room_Th2)	)				•
	1-2 2-3 3-4	IOT - NHS (Room_Th1) JAVA - PVK (Room_Th2) JS - RDM (Room_Th2)	)			1	Þ
	1-2 2-3 3-4 Total Rows: 6	IOT - NHS (Room_Th1) JAVA - PVK (Room_Th2) JS - RDM (Room_Th2)	)			1	•
	1-2 2-3 3-4	IOT - NHS (Room_Th1) JAVA - PVK (Room_Th2) JS - RDM (Room_Th2)	)			I	1



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7) After adding the details system will generate the timetable according to the class or education year.

	VI. CO	MPARISON	
Aspect	Bhaduri et	Dipti	Load
	al. (GAIN)	Shrinivasan	Distribution
		(EA)	and Time
			Table
			Generation
			System
Problem	Educational	University	Educational
Domain	time table	timetabling	time table
	scheduling		scheduling
Methodology	Genetic	Evolutionary	Load
	algorithm	algorithm	Distribution
	with GAIN	(EA)	and Time
			Table
			Generation
			System
Main	Utilizes	Uses problem-	Utilizes
Features	genetic	specific	input
	artificial	chromosome	information
	immune	representation,	on teachers,
	network	heuristics,	subjects,
	(GAIN),	context-based	soft and
	hybrid	reasoning	hard
	algorithm		constraints
Performance	GAIN	Adaptive	Generates
Comparison	reaches	mutation	Feasible
	optimal	scheme for	timetables
	feasible	speeding up	
	solution	convergence	
	faster than		
	GA		
Output	Optimized	Feasible	Feasible
	timetable in	timetables	timetables
	Excel sheet		

### COMPARISON

#### VII. CONCLUSION

The system that the Load Distribution and Time Table Generation Software uses is web-based. Its primary purpose is to create a timetable based on the data entered. This application will make the process of creating time tables easier and more straightforward.



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If time tables were created manually, they might have to be manually entered into a spreadsheet, which could result in limitations or other issues that are hard to figure out. The project is designed so that there are no scheduling conflicts and features that allow the schedule to be customized as needed. This technology automatically generates a separate timetable for each class. It is possible to obtain different slot combinations, enabling the creation of a new schedule when necessary.

The project cuts down on time spent and the discomfort associated with manually creating the schedule. The initiative may lead to future improvements in time constraint issues, leave management. This improvement can be attained by making additional adjustments while maintaining the methodology and methods employed for this project.

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