

INTELLIGENT TIMETABLE PREPARATION

END TERM REPORT

By

Ayush, Saiyam Vikram, Ashutosh Kumar

Section : K18PA

Roll number(s): 39, 38, 40



**Department of Intelligent Systems
School of Computer Science and Engineering
Lovely Professional University, Jalandhar**

April 2020

Student Declaration

This is to declare that this report has been written by **Ayush, Saiyam Vikram,** and **Ashutosh Kumar**. No part of the report is copied from the other sources. All the information included from other sources have been duly acknowledged. We aver that if any part of the report is found to be copied, we shall take full responsibility of it.

Name: **Ayush**

Roll No.: **B39**

Name: **Saiyam Vikram**

Roll No.: **B38**

Name: **Ashutosh Kumar**

Roll No.: **B40**

Place: Jalandhar

Date: 06/April/2020

Table of Contents

Title	Page No.
1. Introduction.....	03
1.1. Objectives.....	03
2. Project Description.....	04
2.1. About Genetic Algorithm.....	04
2.2. Assumptions of the project.....	04
2.3. Solution.....	04
2.4. Modules which are used.....	06
3. Usage.....	06

1. Introduction:-

This project implements one of possible solutions for generating university class schedule. The proposed solution is based on methods of evolutionary computing or genetic algorithm.

The success of solution is estimated on fulfilment of given constraints and criteria.

1.1 Objectives:-

The following are the objectives of the project Intelligent Timetable preparation.

- To find a generic solution that will facilitate generating schedule for University
- Timetable must be the best optimal solution
- Conflicts must be least possible

2. Project description:-

Project follows the genetic algorithm technique to generate the results.

2.1 About Genetic Algorithm:-

Genetic Algorithms(GAs) are adaptive heuristic search algorithms that belong to the larger part of evolutionary algorithms. Genetic algorithms are based on the ideas of natural selection and genetics.

2.2 Assumption of the project:-

Resources (classroom, teacher) cannot overlap timewise

- No teacher can hold two classes at the same time
- No group can listen for two classes at the same time
- No classroom can receive two classes at the same time
- Class should take place only in one of the allowed classrooms, that means a theory class which has a max. student capacity of 70 can not sit in the lab which a max. student capacity of 35 only.

2.3. Solution:-

The algorithm for the timetable is represented as table with its columns as class no., dept, Course, Room no., Instructor, Meeting time allotted to each course with days, where number of classrooms, allowed meeting time,

details of courses, name of Instructor of each course with instructor Id are declared already in the file.

The representation of the class schedule is done in the following picture:-

Class no.	Dept	Course (number, max no. of students)	Room (Capacity)	Instructor (Id)	Meeting Time (Id)
0	CSE	INT404 (C1, 70)	33-501 (70)	Ms. Jasleen Kaur (AP1)	MWF 11:00 - 12:00 (MT3)
1	CSE	CSE408 (C2, 70)	33-501 (70)	Mr. Tarun (AP2)	TTH 13:00 - 14:00 (MT11)
2	CSE	CSE325 (C3, 35)	33-501 (70)	Ms. Suruchi Talwani (AP3)	MWF 16:00 - 17:00 (MT7)
3	CSE	MTH302 (C4, 70)	33-501 (70)	Mr. Arun Kochar (AP4)	MWF 14:00 - 15:00 (MT5)
4	CSE	CSE316 (C5, 70)	33-501 (70)	Ms. Suruchi Talwani (AP3)	TTH 10:00 - 11:00 (MT9)
5	CSE	CSE310 (C8, 70)	33-501 (70)	Mr. Sudha Shankar Prasad (AP7)	MWF 10:00 - 11:00 (MT2)
6	CPE	PEV106 (C6, 70)	33-501 (70)	Ms. Priya (AP5)	TTH 09:00 - 10:00 (MT8)
7	ECE	CSE306 (C7, 70)	33-501 (70)	Dr. Priyanka Chawla (AP6)	TTH 14:00 - 15:00 (MT12)
8	ECE	CSE307 (C9, 35)	34-203 (35)	Mr. Pankaj Kumar Keshri (AP8)	MWF 15:00 - 16:00 (MT6)

In the last column of the above image Meeting time is allotted to each subject with its days for example:-

INT404 is allotted 33-501 room no. with meeting time MWF 11:00 -12:00 (MT3), where MWF means on Monday, Wednesday, Friday from 11:00 AM – 12:00 PM with meeting id MT3.

Also, the generation of the time table which evolves according to it's fitness and no. of conflicts on the basis of genetic algorithm is displayed in the below picture.

> Generation # 3					
Schedule no.	Fitness	No. of conflicts	Classes [dept,class,room,instructor,meeting-time]		
0	1.0	0	CSE,C1,33-501,AP1,MT3, CSE,C2,33-501,AP2,MT11, CSE,C3,33-501,AP3,MT7, CSE,C4,33-501,AP4,MT5, CSE,C5,33-501,AP3,MT9, CSE,C8,33-501,AP7,MT2, CPE,C6,33-501,AP5,MT8, ECE,C7,33-501,AP6,MT12, ECE,C9,34-203,AP8,MT6		
1	0.5	1	CSE,C1,33-501,AP1,MT3, CSE,C2,33-501,AP2,MT11, CSE,C3,33-501,AP3,MT7, CSE,C4,34-203,AP4,MT7, CSE,C5,33-501,AP3,MT9, CSE,C8,33-501,AP7,MT2, CPE,C6,33-501,AP5,MT8, ECE,C7,33-501,AP6,MT12, ECE,C9,34-203,AP8,MT6		
2	0.5	1	CSE,C1,33-501,AP1,MT14, CSE,C2,33-501,AP2,MT11, CSE,C3,34-203,AP3,MT14, CSE,C4,33-501,AP4,MT5, CSE,C5,33-501,AP3,MT9, CSE,C8,33-501,AP7,MT6, CPE,C6,33-501,AP5,MT13, ECE,C7,34-203,AP6,MT11, ECE,C9,34-203,AP8,MT6		
3	0.333	2	CSE,C1,33-501,AP1,MT14, CSE,C2,34-203,AP2,MT14, CSE,C3,33-501,AP3,MT7, CSE,C4,34-203,AP4,MT7, CSE,C5,33-501,AP3,MT9, CSE,C8,33-501,AP7,MT6, CPE,C6,33-501,AP5,MT8, ECE,C7,33-501,AP6,MT12, ECE,C9,34-203,AP8,MT5		
4	0.333	2	CSE,C1,33-501,AP1,MT3, CSE,C2,33-501,AP2,MT12, CSE,C3,33-501,AP3,MT13, CSE,C4,34-203,AP4,MT10, CSE,C5,33-501,AP3,MT9, CSE,C8,33-501,AP7,MT6, CPE,C6,33-501,AP5,MT8, ECE,C7,33-501,AP6,MT12, ECE,C9,34-203,AP8,MT4		
5	0.333	2	CSE,C1,33-501,AP1,MT14, CSE,C2,33-501,AP2,MT11, CSE,C3,33-501,AP3,MT7, CSE,C4,34-203,AP4,MT2, CSE,C5,33-501,AP3,MT9, CSE,C8,34-203,AP7,MT5, CPE,C6,33-501,AP5,MT13, ECE,C7,33-501,AP6,MT12, ECE,C9,34-203,AP8,MT6		
6	0.333	2	CSE,C1,33-501,AP1,MT3, CSE,C2,33-501,AP2,MT11, CSE,C3,33-501,AP3,MT7, CSE,C4,34-203,AP4,MT10, CSE,C5,34-203,AP3,MT1, CSE,C8,33-501,AP7,MT6, CPE,C6,33-501,AP5,MT8, ECE,C7,33-501,AP6,MT12, ECE,C9,34-203,AP8,MT6		
7	0.25	3	CSE,C1,33-501,AP1,MT3, CSE,C2,33-501,AP2,MT11, CSE,C3,33-501,AP3,MT7, CSE,C4,34-203,AP4,MT7, CSE,C5,33-501,AP3,MT9, CSE,C8,34-203,AP7,MT6, CPE,C6,33-501,AP5,MT8, ECE,C7,33-501,AP6,MT12, ECE,C9,34-203,AP8,MT6		
8	0.2	4	CSE,C1,33-501,AP1,MT6, CSE,C2,33-501,AP2,MT12, CSE,C3,33-501,AP3,MT7, CSE,C4,33-501,AP4,MT12, CSE,C5,33-501,AP3,MT5, CSE,C8,34-203,AP7,MT2, CPE,C6,33-501,AP5,MT13, ECE,C7,34-203,AP6,MT11, ECE,C9,33-501,AP8,MT5		

As, we can see in the above picture we have four columns Schedule no., Fitness, No. of conflicts, Classes. Here it started from the 8th row and in the 8th row the fitness was 0.2, No. of conflicts were 4 and schedule which was generated is shown in the classes column with comma seperated values, For example CSE,C1,33-501,AP1,MT6 means dept is CSE, course id is C1

which is declared already in the file for the INT404, and room no. is 33-501, instructor id is AP1 which is already declared for the Ms. Jasleen Kaur and MT6 means meeting time 6 which is Monday, Wednesday, Friday from 15:00hrs – 16:00hrs. After that evolved and finally reached to the 0th schedule where we can see the No. of conflicts are zero and the Fitness is 1. So it is the best optimal solution and it is then printed in the final format which is shown earlier.

It is not always true that no conflicts will arise, it totally depends how much hard the constraints which had been provided are.

However, in that case also it will always provide the best optimal solution.

2.4. Modules which are used:-

PrettyTable:- Only one external module has been used, i.e. PrettyTable. PrettyTable is a module which is used to log the matrix or table output in a prettier format. It is a open source Library under the pip repository.

3. Usage:-

To run this code first open the terminal in the directory and run the command:-

pip install PrettyTable

If there is no error then, PrettyTable will be installed in the system after that we can run the command

python ai.py

Note:- It is necessary that python must be installed in the system to run the code.

BONAFIDE CERTIFICATE

Certified that this project report “**Intelligent Time Table Preparation**” is the bonafide work of “**Ayush, Saiyam Vikarm, Ashutosh Kumar**” who carried out the project work under my supervision.

Signature

Ms. Jasleen Kaur

Assistant Professor

UID:- 25340

Department of Intelligent Systems

School of Computer Science and Engineering

Lovely Professional University, Jalandhar