Department of Information Technology

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UNIVERSITY OF MUMBAI

Academic Year 2019-2020

A Project Report on

AUTOMATIC TIMETABLE GENERATOR USING GENETIC ALGORITHM

Submitted in partial fulfillment of the degree of

Bachelor of Engineering(Sem-7)

in

INFORMATION TECHNOLOGY

By

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1.Project Conception and Initiation

1.1 Abstract

- Time table generation is tedious job.
- The project will generate time table automatically thereby saving time required to design manually.
- The system will take various inputs like number of subjects, teachers, workload of a teacher, semester, priority of subject. By relying on these inputs, it will generate possible time tables for working days of the week for teaching faculty.
- Generate timetable automatically in such a way that that their timings do not overlap.
- The traditional hand operated method of time table is very time consuming

1.2 Objectives

- To reduce the load on Time table co-ordinator, as it's time consuming and it takes lots of effort.
- To optimize the use of the resources and get the best use of the IT infrastructure.
- To minimize the manual intervention in creation of the timetable.
- Generates multiple useful views from timetable.
- To make timetable system generic so that it can work equally well for different Schools, Colleges and Universities.

1.3 Literature Review

- Paper Title: On line helpdesk for college departmental activities.
- Authors:Asha,V.G.,&Babu,K.N.R.M.(2017).
- Publicationdetails:2017 International Conference on Intelligent Computing and Control Systems (ICICCS).
- Findings: Timetable generation using Genetic Algorithm
- Advantages: Accurate and gives output in short time.
- Disadvantages: Complex Algorithm, time consuming.

Literature Review

- Paper Title: A study on heuristic timetabling method for faculty course timetable problem.
- Authors: Bong ChiaLih,SzeSanNah,&Bolhassan,N.A.(2015).
- Publication details: 2015 9thInternational Conference on Itin Asia(CITA).
- Findings: Timetable generation using Genetic Algorithm with two-heuristic approach.
- Advantages: Gives a better solution.
- Disadvantages: Complex Algorithm, time consuming

Literature Review

- Paper Title: An investigation of timetable satisfaction factors for a practical university course timetabling problem.
- Authors: Yang,X.F.,Ayob,M.,&Nazri,M.Z.A.(2017).
- Publication details: 2017 6th International Conference on Electrical Engineering and Informatics(ICEEI).
- Findings: Timetable generation using Scheduling Algorithm
- Advantages: Moderate result.
- Disadvantages: There is no optimal solution.

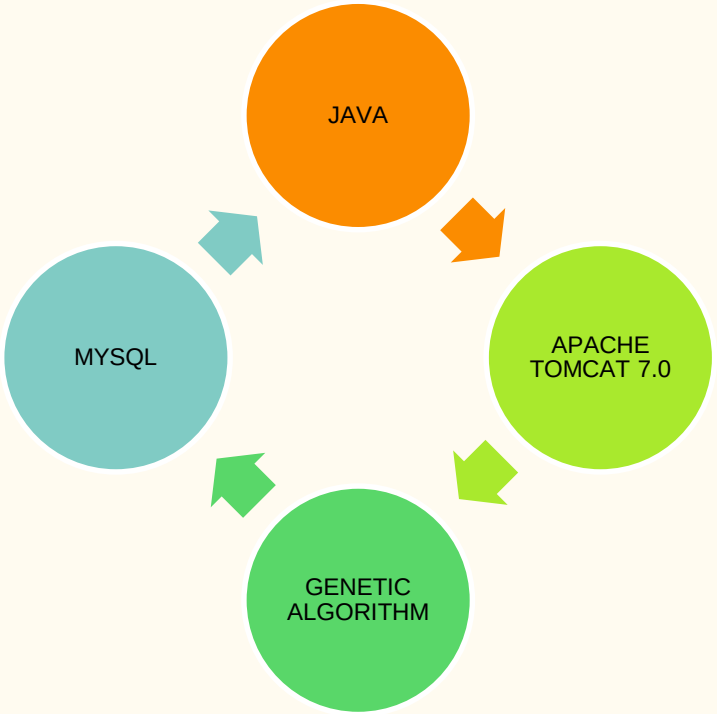
1.4 Problem Definition

- Timetable generation manually requires time and it’s difficult for the person to handle all the constrains that need to be considered.
- Utilization of the resources cannot be done completely due to multiple constrains.
- Above problem will be handled by the software, as we will be predefining all the constrains in our system and provide a proper utilization of the resources.

1.5 Scope

- Separate timetable for the individual class, faculty and labs will be generated automatically by this system.
- The project reduces time consumption and the pain in framing the timetable manually.
- The project is developed in such a way that, no slot clashes occur providing features to tailor the timetable as of wish.
- Additional features that is included in the project is that there is no headache of giving much input.
- This system can be used by Schools and Colleges to create Time-Table.

1.6 Technology stack



1.7 Benefits for environment & Society

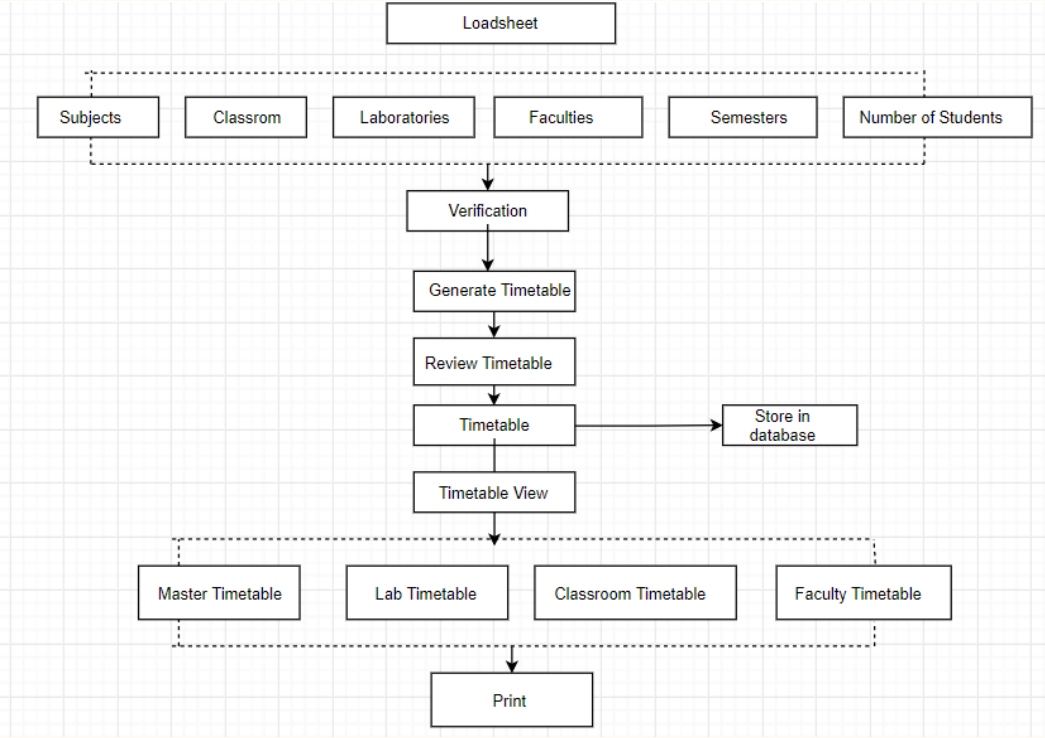
- It will be beneficial for the environment by saving papers and ink on basic level.
- The stress of making timetable manually sometimes irritates the person which in some or other way effects the society.
- The human time will be saved.

2. Project Design

2.1 Proposed System

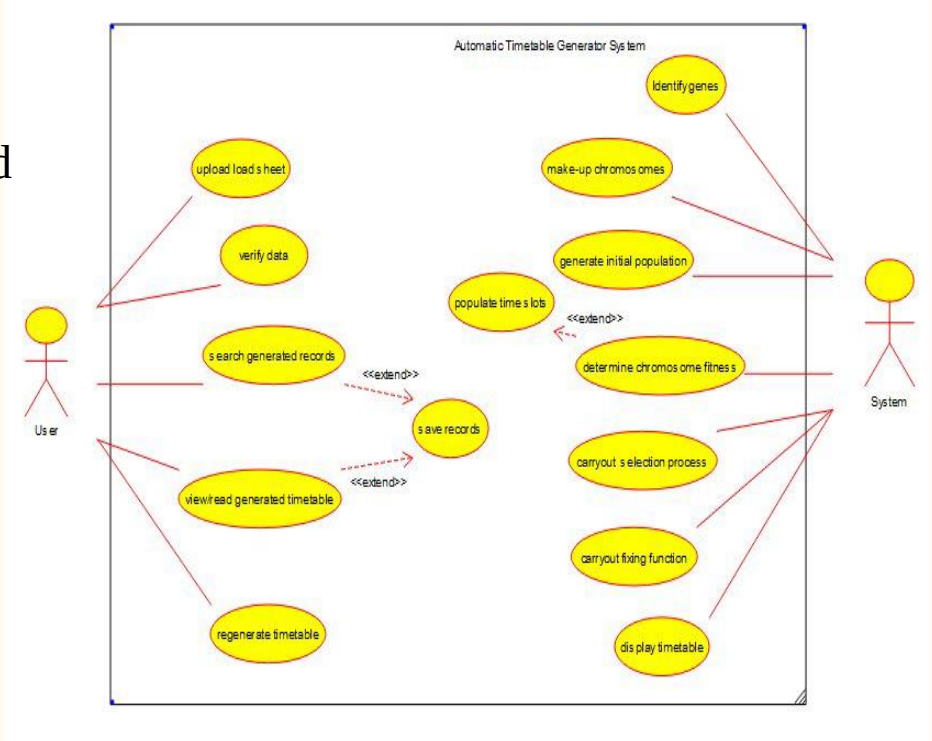
- System will take the basic inputs such as subjects, classrooms, laboratories, faculties, semester through load sheet.
- These inputs will be processed and further it will be validated and the system will check whether its requirements is fulfilled or not.
- The system generates the timetable which if approved will be stored in the database.

2.2 Design(Flow Of Modules)

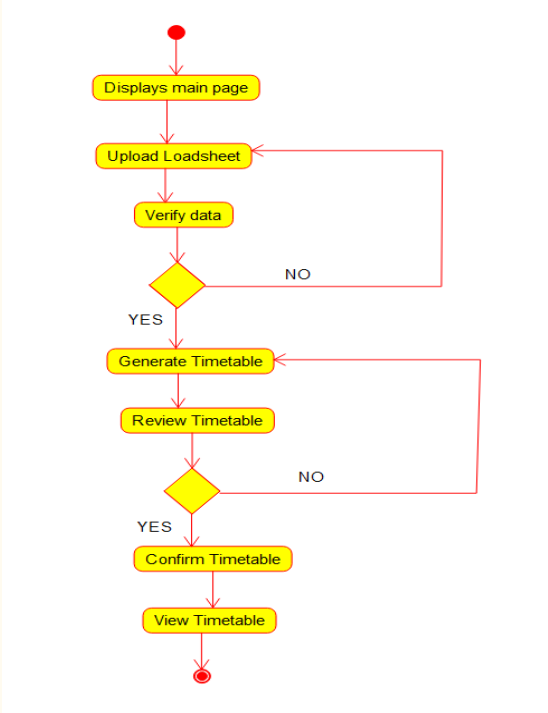


2.3 Description Of Use Case

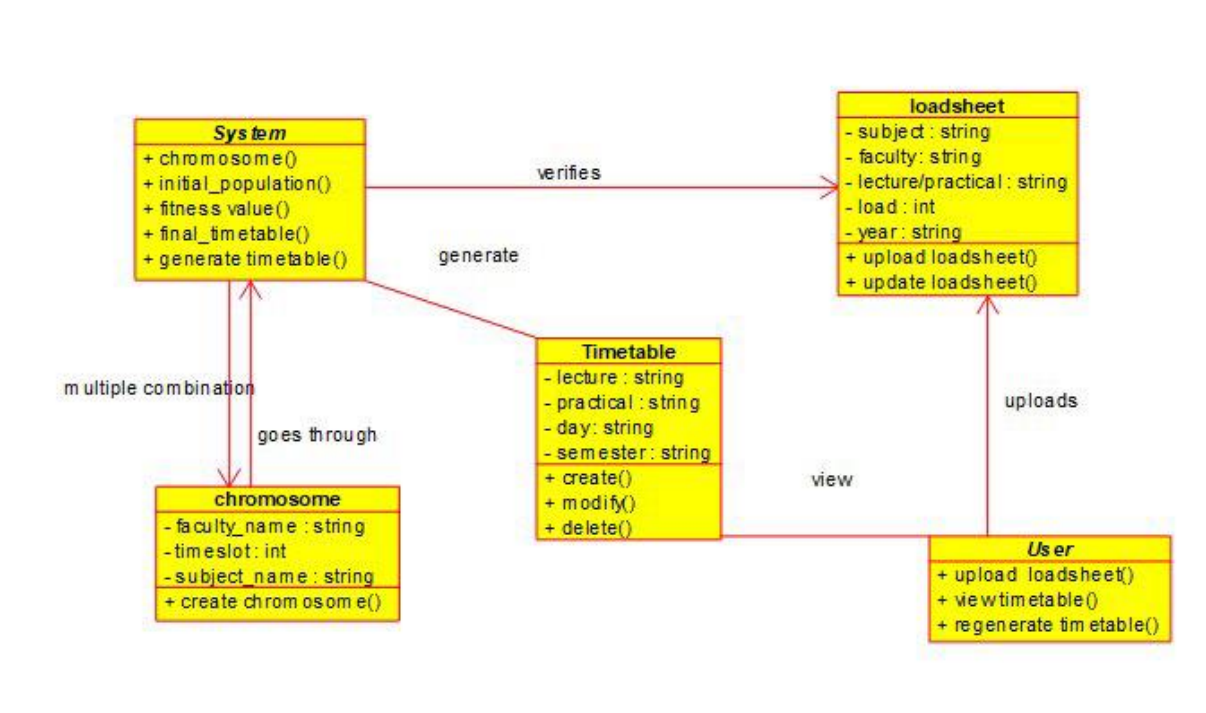
- User uploads load sheet.
- System uses the load sheet and generated required data and passes it to GA.
- GA generates the Time Table and shows it to the user.
- User can proceed with the timetable and Save it to db or regenerate the same.



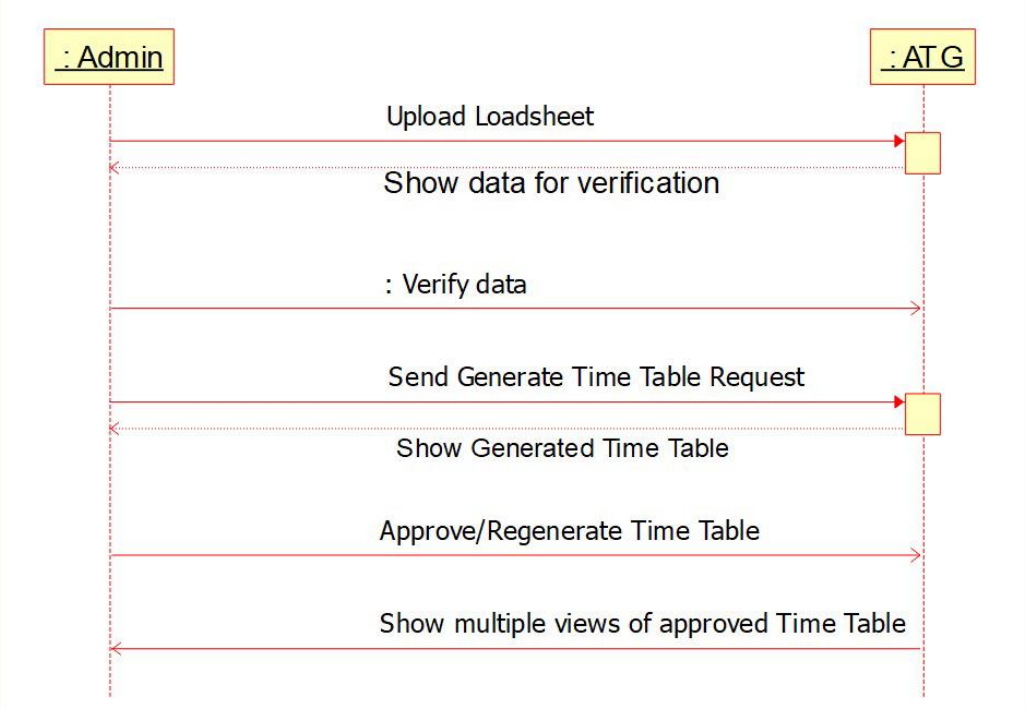
2.4 Activity diagram



2.5 Class Diagram



Sequence Diagram



2.6 Module-1

CSV Uploadation

- Downloadable required format has been included on the page.
- User can modify the data and upload the csv file with all the set of data.
- CSV reader library is used to read the csv file and further the data is stored in list and arrays.

Module-2

Data Verfication

- The CSV file data is shown on GUI to user for verification.
- The user has option to verify or modify data.
- Once,the user verifies the data,it is sent to GA for processing,

Module-3

GENETIC ALGORITHM

- The data received from csv is used for population generation on faculty basis.
- From the generated population the algorithm picks up random value which is known as chromosome ,which in our case is faculty name, load of faculty, lecture type (theory(l)/practical(p)).
- This chromosome are arranged in multiple combinations on the grid of timetable,and once all the faculties are assigned for their loads the final timetable is generated.

Module-4

Timetable view

- Time table generated by GA will be displayed here and user will be asked to approve or regenerate the time table.
- If the user doesn’t likes the arrangement he/she can regenerate it,this will result in re-running of GA for the same data but with new result.
- If user approves the timetable generated,it will be stored in database and available to user at few clicks.

2.7 References

1.Asha,V.G.,&Babu,K.N.R.M.(2017).
On line helpdesk for college departmental activities. 2017 International Conference on Intelligent Computing and Control Systems (ICICCS).
https://ieeexplore.ieee.org/document/8250600/
2.Yang,X.F.,Ayob,M.,&Nazri,M.Z.A.(2017).
An investigation of timetable satisfaction factors for a practical university course timetabling problem. 2017 6thInternational Conference on Electrical Engineering and Informatics(ICEEI).
https://ieeexplore.ieee.org/document/8312409
3.BongChiaLih,SzeSanNah,&Bolhassan,N.A.(2015). A study on heuristic timetabling method for faculty course timetable problem. 2015 9thInternational Conference on ITin Asia(CITA).
https://ieeexplore.ieee.org/document/7349832

3.Planning for next semester

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Planning

- Viewing the output on GUI instead of console.
- Allocation of labs, and elective subjects.
- Converting the output to printable file.

Thank You