CS208
Design & Analysis of Algorithm

COURSE TIMETABLING
Analysis and implementation

26th February'19

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PROJECT PROPOSAL

Overview :-

This paper is concerned with the problem of constructing timetables for schools. School timetable construction problems are interesting objects to study because neither modelling nor solving them is straightforward. It is difficult to make a clear-cut distinction between acceptable and not acceptable timetables. Because of the large diversity in acceptance criteria, realistic timetable construction problems are multidimensional. Each dimension may introduce its own characteristic aspects that add to the complexity of the problem. Therefore, only heuristic solution approaches without known performance guarantees are practically feasible.

Objective :-

The main focus will be to discuss the approaches taken for specific problem solving for course timetabling. We will discuss two approaches, viz,

- ➢ GENETIC ALGORITHMS
- ➢ ANT COLONY ALGORITHMS

As discussed above, none of the above algorithms is the silver bullet for course timetabling so we will use hybrid algorithm to make a better approach towards solving the problem

1. To study implementation of Genetic Algorithms and Ant Colony Algorithms.
2. To show where an algorithm is better than the other one for a specific problem.
3. To implement constraints such as penalties and priorities.
4. To combine both the algorithms and solve it using hybrid algorithm.

About the Algorithms :-

1. **Genetic Algorithm** : These are adaptive heuristic search algorithm based on the evolutionary ideas of natural selection and genetics. As such they represent an intelligent exploitation of a random search used to solve optimization problems. Although randomised, GAs are by no means random, instead they exploit historical information to direct the search into the region of better performance within the search space. The basic techniques of the GAs are designed to simulate processes in natural systems necessary for evolution, especially those follow the principles first laid down by Charles Darwin of "survival of the fittest.". Since in nature, competition among individuals for scanty resources results in the fittest individuals dominating over the weaker ones.

2. **Ant Colony Algorithm** : The ant colony algorithm is an algorithm for finding optimal paths that is based on the behaviour of ants searching for food. At first, the ants wander randomly. When an ant finds a source of food, it walks back to the colony leaving "markers" (pheromones) that show the path has food. When other ants come across the markers, they are likely to follow the path with a certain probability. If they do, they then populate the path with their own markers as they bring the food back. As more ants find the path, it gets stronger until there are a couple streams of ants traveling to various food sources near the colony.