



# Greedy Search and Pruning based Sports Management System

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## Abstract:

In sports event management, the schedule is generated manually which is time consuming, hectic and less accurate process. Also keeping manual records of all the events and updating their results is inconvenient for the management committee. The idea here is to develop a college sports system using artificial intelligence which would bring the entire manual process of sports event management online. The objective is to develop a student friendly system which will convey any event or happening in sports. This system would provide better management of events by auto generating the schedule of matches considering major factors like availability of players, time slots which also includes rules of matches and students interested for becoming event heads (referees) can apply for the nomination and enroll in any sport event.

**Keywords:** Auto-Scheduling, Intelligent System, Event Management

## I. INTRODUCTION

The main challenge of conducting any event is generating the schedule and making arrangements based on it. Many aspects need to be studied before preparing the schedule that can be followed properly. In sports event management, selecting the opponents and assigning time slots for matches needs to be done considering various factors. The matches should not have conflicting timings that may cause inconvenience to the players. The selection of opponents should be unbiased. This process can be carried out using intelligent system for desired results. The manual efforts would be reduced and optimal solutions can be obtained for generating the schedule. It has made entire process fair and transparent among the students and student council.

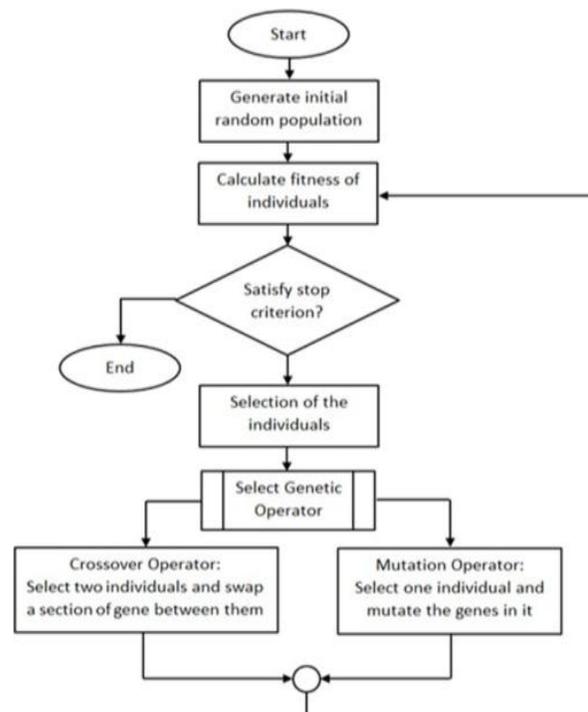
## II. METHODOLOGY

In literature, there have been many optimization algorithms described that can be used for scheduling of events such as Genetic Algorithm, Ant Colony Optimization, Greedy Search, etc.

### 1. Genetic Algorithm (GA):

GA is a search-based optimization technique based on the principles of Genetics and Natural Selection. It is used to find optimal or near-optimal solutions to various problems. Optimization refers to finding the values of inputs in such a way to obtain the best output values. The set of all possible solutions or values which the inputs can take make up the search space. In this search space, lies a point or a set of points which gives the optimal solution. In GAs, a pool or a population of possible solutions to the given problem is present. These solutions then undergo recombination and mutation (like in natural genetics), producing new children, and the process is repeated over various generations. Each individual (or candidate solution) is assigned a fitness value (based on its objective function value) and the fitter individuals are given a higher chance to mate and yield fitter

individuals. In this way the algorithm keeps evolving better individuals or solutions over generations, till a stopping criterion is reached.



Genetic Algorithm performs much better than random local search in which various random solutions are tried keeping track of the best so far, as they exploit historical information as well.

### 2. Ant Colony Optimization:

It is a population-based metaheuristic that can be used to find approximate solutions to difficult optimization problems. In this, a set of software agents called *artificial ants* search for good solutions to a given optimization problem. To apply Ant

Colony Optimization, the optimization problem is transformed into the problem of finding the best path on a weighted graph. The artificial ants incrementally build solutions by moving on the graph. The solution construction process is stochastic and is biased by a pheromone model, that is, a set of parameters associated with graph components (either nodes or edges) whose values are modified at runtime by the ants.

### 3. Greedy Algorithm:

A greedy algorithm is a mathematical process that looks for simple, easy-to-implement solutions to complex, multi-step problems by deciding which next step will provide the most obvious benefit. In greedy algorithm approach, decisions are made from the given solution domain. As being greedy, the closest solution that seems to provide an optimum solution is chosen. It tries to find a localized optimum solution, which may eventually lead to globally optimized solutions.

Greedy algorithm builds a solution part by part, choosing the next part in such a way that it gives an immediate benefit. Greedy method is easy to implement and quite efficient in most of the cases. Greedy algorithm is an algorithmic paradigm based on heuristic that follows local optimal choice at each step with the hope of finding global optimal solution.

In many problems, it does not produce an optimal solution though it gives an approximate (near optimal) solution in a reasonable time.

### III. COMPARISON OF ALGORITHMS

Considering the needs and constraints of the application, the most suitable approach is Greedy algorithm. For event scheduling in colleges, historical data of players cannot be considered as weighing factor since the players keep on changing every year.

Hence, Genetic algorithm and Ant Colony Optimization approach that uses heuristics based on weighted graphs cannot be used.

In greedy approach, the decision is taken on the basis of current available information without worrying about the effect of the current decision in future. This approach never reconsiders the choices taken previously. The decision of team selection is independent of previous decisions and team selection is random. Therefore, makes it suitable for the proposed and developed application.

Greedy algorithms work by recursively constructing a set of objects from the smallest possible constituent parts. Recursion is an approach to problem solving in which the solution to a particular problem depends on solutions to smaller instances of the same problem.

The advantage to using a greedy algorithm is that solutions to smaller instances of the problem can be straightforward and easy to understand.

Greedy algorithm satisfies the requirements of the proposed and developed application and gives optimal solution in a

less complex method as compared to other optimization algorithms.

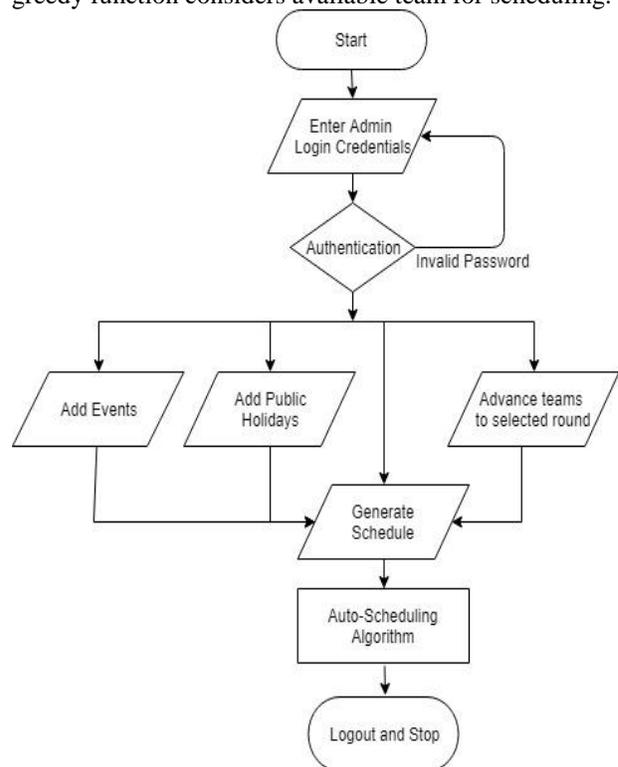
The disadvantage of Greedy algorithm is that it is possible that the most optimal short-term solutions may lead to the worst possible long-term outcome. However in this project, the factor to determine optimality of generated schedule is timely completion of schedule. There is no specific goal state that can be achieved. So, here the disadvantage does not affect schedule generation, which makes it more suitable to use for this application.

### IV. PRUNING

Pruning is a technique in machine learning that reduces the size of decision trees by removing sections of the tree that provide little power to classify instances. Pruning reduces the complexity of the final classifier, and hence improves predictive accuracy by the reduction of overfitting.

### V. IMPLEMENTATION DETAILS

The algorithm generates multiple iterations of schedule. Global cost (minimum time taken by schedule to complete particular round) of these iterations is compared and the schedule with minimum global cost is selected. In each iteration, the events to be scheduled are randomly shuffled. The participating teams are also randomly shuffled. The data is fetched by a function which checks if any member of particular team has another match scheduled at the same time. If yes, that team is pruned from current iteration. If no, then greedy function considers available team for scheduling.



Along with the ease of auto-generation of schedule, the system provides facilities of login, view events, view schedule, winners and class score, and from admin side, administrator can add and delete events, generate schedule, add public holidays etc.

## VI. RESULT

Round	Teams	Date & Time
Registered	D14 (D14) vs D15 (D15)	11-Apr-2018 04:00 PM - 05:00 PM
Registered	D11 (D11) vs D20 (D20)	16-Apr-2018 12:38 PM - 04:00 PM
Round	Teams	Date & Time
Registered	ABHISHEK GURAV (D13) vs TANMAY RAUTH (D11)	11-Apr-2018 03:00 PM - 04:00 PM
Registered	CHAYAN AGRAWAL (D20) vs MANISH MADHWANI (D12)	11-Apr-2018 03:00 PM - 04:00 PM
Registered	Aaditya Kulkarni (D4) vs SATISH FULWANI (D15)	11-Apr-2018 03:00 PM - 04:00 PM

## VII. CONCLUSION

A web app is developed for sports event management using AI algorithms. This app is capable of auto-scheduling events considering availability of students. It supports other features like display of schedule, winners, individual score as well as class score. Students can register as a player or as a referee for different events. Hence the process is changed with more convenience in viewing event related information as well as participating in it. It has reduced manual efforts and gives a fair and optimal results quickly. The system is designed in such a way that novice users can also understand the functionalities of the system.

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