An Intelligent method for Selecting and Recommending best Players to help Build Sports Team

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ABSTRACT

Selection of Players for sports within finite budget is complex task which can be viewed as constrained multi objective optimization and multiple criteria decision making problem. To solve this problem we are proposing a system for providing an interactive sports game to a plurality of participants wherein each participant wishes to form a sports team made up of actual players with the recommendation of team to player and vice versa.

General Terms

Data Mining, Information Retrieval, Performance, Task, Algorithm, strategy, Academy, Self management

Keywords

Team, Player, Agent, Recommendation, Optimization, Recommendation, Selection, Team Formation, Active Window Filtration

1. INTRODUCTION

We ask that authors follow some simple guidelines. In essence, we ask you to make your paper look exactly like this document. The easiest way to do this is simply to download the template, and replace the content with your own material. Sports are all forms of usually competitive physical activity which, through casual or organized participation, aim to use, maintain or improve physical ability and skills while providing entertainment to participants, and in some cases, spectators. Hundreds of sports exist, from those requiring only two participants, through to those with hundreds of simultaneous participants, either in teams or competing as individuals. In organized sport, records of performance are often kept, which is helpful to track all the players [1].

In any game, player statistics has multiple parameters like number of matches played, total scores made, number of years played, number of matches won/lost etc. It is important to identify all these statistical parameters which reliably indicate player's performance and improves the team selection process. The overall aim of my paper is to build a team of players with optimum multiple parameters within budget and rule constraints. Rule tables has to be made as a data set where every constraint like presence of at least one player, overseas players in a team, health issues also have to be taken in account. Considering the large amount of statistical data denoting various sports attributes that is available for each of the players in every sport, we first tend to reduce the dimension of data.

When searching for a group of experts to hire, teams aim to find the most cost effective player that can accomplish their goals. The hiring process includes allocating an available budget toward the recruitment of a set of experts from a collection of candidates, in order to form a team that has all the required expertise to play a large number of profitable games.

As an example, consider the selection of player in Indian cricket team. In this, the management team has to hire players that allow it to maximize its sport academic benefit, given the current opportunities and trends in terms of matches won and level of matches played, scores, etc. Given the available budget, the goal is to select a cluster of players that can collectively maximize the nation's benefit. The benefit can be measured in terms of the number of matches won, the number of times India won man of the match or any other parameter that the nation wants to optimize.

In this paper, I examine the strategic sophistication of individuals and team. An important step in developing effective teams is the selection of team members. One approach involves managers or human resource professionals making selection decisions. They identify team needs, characteristics that will meet those needs, and assess and select qualified players. A second approach is selection by team members. With this approach, current team members assess players and choose new members. Our focus is on this approach. Self-selection among groups and teams appears to be fairly common. One indication of this is the increasing use of self-managing team, which are, by definition, self-staffing.

Despite the widespread use and prevalence of self-selection, not much is known about how self-selection takes place particularly, the characteristics that people perceive as important when selecting new team members [2].

2. LITERATURE SURVEY

Team formation is a key issue in today's world, and there have been a number of studies on coalition formation and team formation from the view point of the task or resource allocation problem [3].

Faez Ahmed, Abhilash Jindal, proposed that Criteria and a better team can be selected by the systematic procedure. Abstract factors like team coordination etc. can also be used for decision making process [4].

Matthew E. Gaston Marie desJardins, developed model that provides a dynamic team formation environment where agent teams form spontaneously in a completely decentralized manner and the agent's decision making is based solely on local information [5].

Maarten Fokkinga defined the formation of teams from a given set of players such that, when repeated many times, each player is equally often teammate of each other player [6].

S.M. Aqil Burney, Nadeem Mahmood found optimal solution For the problem of team selection on the basis of the previous outcomes which is Generic model for multi-player games [7].

Aris Anagnostopoulos, Luca Becchetti explored method where each team possesses all skills required by the task and each team has small communication overhead [8].

Stanislav Dadelo, Zenonas Turskis presented a novel approach where Player rating systems are based on performance statistics, which reflect situational factors of the game [9].

Masashi Hayano, DaiHamada, Toshiharu Sugawara presented a paper where they applied team formation method for multi-agent systems consisting of self-interested agents in task-oriented domains where agents have no prior knowledge of the resources or abilities of the other agents [10].

3. PROPOSED METHOD

Our goal is to form effective teams, by considering the players performance in the task and modeling the effects among players in the team. We build upon the related research, and focus on the following:

3.1 Team Formation

Team formation is focused on the problem of selecting the best subset of player in optimal way that can complete a task.

In this section, we formally define the team formation problem that models the effects of agents working together in a team, and contribute our team formation method to form an effective team for the task [3].

1) Define types of game:

$$G = \{g1, g2, \ldots , gn\}$$

Where, gn defines each different game. G 2 G where, G is a subcategory of game.

2) Formally Defining the Team Formation Problem, suppose the decision maker is going to select one player from n player members to form a team.

We begin with the definition of the set of players and the definition of a team:

$$P = \{Pi|i = 1, \ldots , n\}$$

Where, pn ε P is aplayer: a set of n player members.

$$I = \{Ig|g = 1, \ldots , l\}$$

It is a set of l individual attributes, and each Ig is additively independent.

3) Giving weightage to player and team

$$V = \{v1, v2, \ldots , vl\}$$

The weight vector of individual attributes, which can be determined by either directly or indirectly assign.

$$W = \{w1, w2, \ldots , wm\}$$

The weight vector of collaborative attributes, which can be determined by either directly assign or indirectly.

4) Selection of player

$$X = \{x1, x2, \ldots , xn\}$$

The decision vector of member selection, where xn = 1 if member Pn is selected and xn = 0, otherwise [12].

3.2 Recommendation of Team Players and Vice Versa

Recommender system is very important in today's life. It minimizes a lot of searching work when we find automated match. This thing I am trying to bring in sports. The main goal is to find best match of player to the team and best match of team to the player.

When Team is in short of player or when team is finding a player, recommender system will short list the best matched player to the team using its ranking and profile of player. Same is applicable when player needs team to play; my recommender system will suggest team based on profile.

$$S = \{Pr, Tr, Pp, Tp\}$$

Where,

Pr=Player required

Tr=Team required

Pp= Player profile

Tp=Team profile

$$f(Tr) = \begin{cases} Tr \ and \ (Tp == Pp) & : \ Select \\ otherwise & : \ Reject \end{cases}$$

$$f(Pr) = \begin{cases} Pr \ and \ (Pp == Tp) & : \ Select \\ otherwise & : \ Reject \end{cases}$$

3.3 Active Window Filtration

In Active Window Filtration we are going to consider an extra parameter for the further of players. It reduces the task of searching players who are not active. Various parameters can be considered for this filtration. The parameter I am going to consider here is how many times player logs in, if the player is available on a particular day for the game(to play), whether player has recently played.

S is our System

$$S = \{I, O, D, NDD\}$$

Where,

I = Input

O = Output

D = Deterministic data

NDD = Non deterministic data

$$I = \{P, L, A, R, AW\}$$

Where,

L= Player logs in

A= Player available

R= player recently played

$$f(AW) = \begin{pmatrix} P == A \ \&\& \ P == R \\ L > \bar{x} \end{pmatrix} Recommend \ Player$$

Where,

$\bar{x}$ = Average parameter considered for number of times user logs in

4. DATA SET DISCRIPTION

Collection of various data and using it as database to retrieve information. Following are few examples which is used to design a system.

1) http://cricsheet.org/ which is retro sheet for cricket.

2) Game list (Cricket, football, etc.)

3) Sub type in selected game (box cricket, T20, etc.)

4) Category of player (Male, Female, Under 18, etc.)

5) Roles for all games (Rules defined, e.g. 11 player-4 batsman,

4bowler, 2- keeper,1-extra, etc.)

6) Sub Category of all Player (e.g. Left/right handed batsman, spinner, etc.)

7) Player profile

8) Ranking of player/team according to weightage

5. SYSTEM MODEL

The System model consists of two extensions. First, the team selection is done by player from n player members. Secondly, Team and players are recommended to each other.

5.1 Selection and Formation

1) The flow of my design will be, first the agent will choose game say, Cricket.

2) Then agent will choose the criteria under cricket game i.e. sex, age, etc.

3) There is a data set called Role table where roles of each game is defined i.e. how many players are necessary to play games and the characteristics of player in game required. E.g. cricket requires 11 players- 4 batsman, 4- bowler, 1 wicket keeper, 1- captain, and extra person.

4) Special attributes for each player in role table. E.g. batsman- left hander, right handed.

5) The agent will get list of other players accordingly. I used ranking algorithm and weights for each player is given accordingly which is helpful in retrieving players to the agent. Choose player from the list and send them interest request for match.

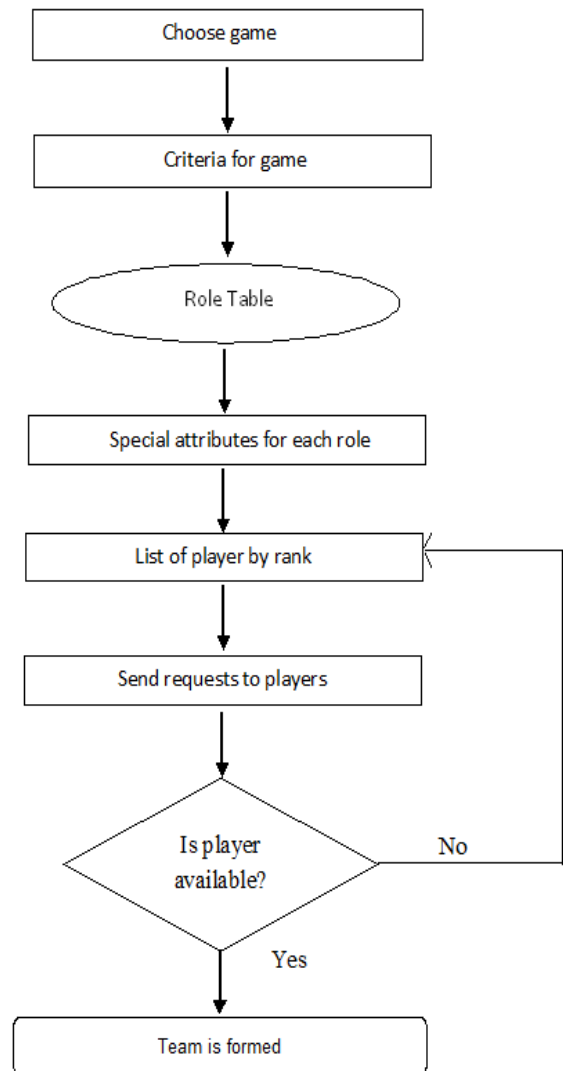6) If player is available and interested he responds to the agent.

Fig.1 Flowchart for Selection of players from n player members

5.2 Recommendation of Players to Team and Vice Versa

1) Players are ranked by considering various parameters and weights are given accordingly.

2) Teams and Leagues are also ranked and weights are given accordingly.

3) If team requires player then list of players are shown to team who matches the teams profile and vice versa.

4) Team will send requests to the available players accordingly and vice versa.

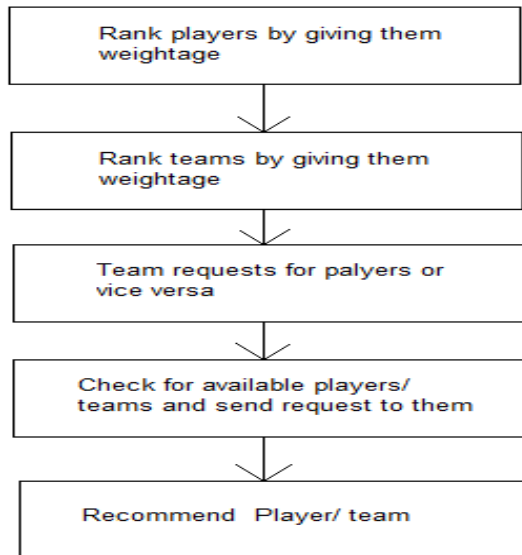5) If interested to join the team the players will respond and vice versa.

Fig.2 Model for recommendation of player to team and vice versa

5.3 Active Window Filter

In Active Window Filtration the flow will be same as team formation but we are going to add one extra filter after listing players by their rank. Here if there is more number of players then selecting players even if their rank is good is not a good option. Therefore I propose a model of Active Window where players are filtered. Only those players who are available and active can be recommended which is helpful in formation of team player with active players.
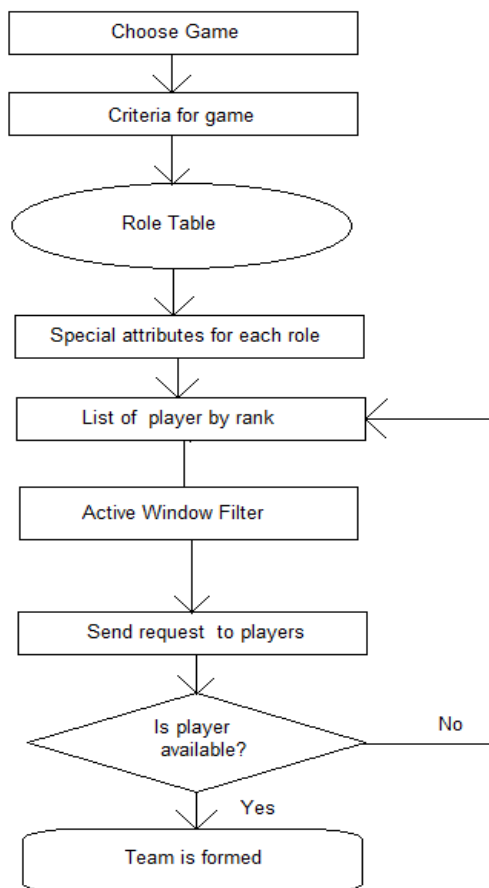

Fig.3 Flowchart for Active Window Filter

6. CONCLUSION AND FUTURE WORK

In my work, I address the team formation problem with applications in various sports platform and propose a novel way to quantify and optimize a team's collective ability to solve a specific task. My work aims to evolve better teams using an evolutionary approach that optimizes the collective abilities of teams rather than the individual abilities of the team members.

In future work, I would like to extend the proposed model for experts possessing multiple skills viz. bowler can be spinner, underarm overarm,etc and many more skills regarding all players. I would also like to consider the availability of the player for example if the player is available on a particular for play and also extend by taking into consideration the fact of personal attributes like health which ultimately affects the formation of a team.

7. ACKNOWLEDGMENTS

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