Modified Group Decision Algorithm for Performance Appraisal of Indian Premier League Cricketers

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Abstract: - Multi Criteria Decision Making (MCDM) is a major technique in the field of performance appraisal. In time to time numerous MCDM procedures are proposed to solve multi criteria problems. The different methods may provide different results on the same problem, which is the major fault of MCDM. To overcome this our proposed technique namely as Modified Group Decision Analysis (MGDA) plays the vital role. Indian Premier League (IPL) T-20 cricket tournament dataset is to be considered for applying MGDA. The assessment of the players by using four different MCDM techniques considered as an input of group decision method and the output produces the rank of the players. The result shows that proposed model yields more realistic way to judge the players and resolve deficiency of MCDM process.

Key-Words: - Group Decision, IPL, MCDM method, Performance Appraisal, Spearman Ranking

1 Introduction

Decision Making is the most key factor for an organization. A right decision gives the organization much more benefit in all respect. In early, decision made with a single or two criteria by the decision makers but nowaydays decision maker take their decisions on the basis of numerous criteria and new techniques are created for problem solving. One state-of-the-art that decision makers are used to make their decision is known as Multi Criteria Decision Making (MCDM). In early 70’s Multi Criteria Analysis was introduced to help the decision makers to evaluate the performance appraisal of any organization or person. Several MCDM methods like Weighted Sum Method (WSM), Analytical Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), COMplex PROportional ASSessment(COPRAS), VIKOR, ELECTRE, PROMETHEE, etc. illustrated by Muralidharan [1] & Pourjavad [2].

AHP, the pair-wise comparison process with hierarchical representation was launched in 1980 by T.L.Saaty [3, 4] to support the decision makers for assessing the relative importance between criteria and determining ranking of the alternatives [5]. In the proposed method AHP is used for calculating the weights of the different criteria of the players. TOPSIS was first introduced by Hwang and Yoon [6], which is based on the relative closeness among the positive ideal solution and the negative ideal solution. In 2011 Bowlers performance evaluation in IPL using AHP-TOPSIS and AHP-COPRAS was done by us [7]. Statistical Analysis was introduced in MCDM [8] for overcome the drawback of AHP by us in the year 2012 and Multi-Criteria decision tree approach [9] used for classify the all-rounders in IPL into several class so that the all-rounders base price fixed for similar type players derived in 2013. COPRAS is a procedure for multi-criteria evaluation of both maximizing and minimizing the criteria, launched by Zavadskas,

In this fast entertainment era Twenty-20 cricket becomes one of the most popular entertaining sports among all different forms of cricket played at the international level [12, 13]. The popularity of Twenty-20 cricket reach the peak after started IPL in India in the year 2008 by Board for Control of Cricket in India (BCCI) [14, 15, 16]. Initially, IPL started with 8 franchises or teams but in IPL session-V 9 teams took participated. The franchise owner formed their teams by competitive bidding from a collection of Indian and Overseas international players and the best of Indian upcoming talents. In cricket players are several jobs like batting, bowling (spin or fast), wicket-keeping, fielding, captaincy etc. H.H. Lemmer proposed several techniques for calculating the performance of bowlers, batsmen [17, 18, 19]. A graphical display for comparing the performances of bowlers, batsmen and all-rounders are presented by Paul J. van Staden [20]. Player valuations in the IPL by their previous performance, experience and other characteristics of individual players were done by David Parker and et al. [21].

In the proposed methodology at first performance measure and overall ranking are calculating separately by using WSM, TOPSIS, COPRAS, VIKOR with weight obtain by AHP. After that correlation coefficient is calculated among the techniques and finally group decision apply to ranking the players using additive and multiplicative ranking method. This proposed algorithm overcomes the constraints of the MCDM that ranking by several techniques provide different rank of the same alternatives with same criteria.

The paper is organized as follows: Section 2 focuses on the different terminologies that are used to judge the players. Section 3 discusses about the proposed methodology. Experiment and results are carried out on section 4. Finally, section 5 concludes the paper.

2 Terminologies used

In cricket there are several categories of players like batsman, fast bowler, spin bowler, all-rounder, wicket keeper etc. The vital role of batsman in cricket is to score the runs for his team whereas the bowlers bowl their predefined quota of over in a match to restrict the opponent in a lower total and take wickets. In cricket bowlers are mainly two types. One is Fast Bowler who can bowl very fast and other is Spinner who can bowl with rapid rotation but the speed is much less than the fast bowler. In cricket All-rounder are those players who can bat and bowl for their team plays an important role. Wicket-Keeper role is to keep the bowl behind the wicket.

The importance criteria of a batsman which are used to assess the performance of batsman are as follows:

- **BT-INNS**: No. of innings played a particular batsman in a series.
- **BT-NO**: No. of not out innings of a batsman in a tournament while batting.
- **BT-RUNS**: Total runs scored by a cricketer in a series of matches.
- **BT-AVG**: The total number of runs he has scored divided by the number of times he has been out.
- **BT-SR**: The average number of runs scored per 100 balls faced by a batsman.
- **BT-FIFTY**: The number of innings in which the batsman scored fifty to ninety-nine runs.

The following properties of a bowler play the vital role to estimate the player’s performance in T-20 cricket:

- **BL-INNS**: No. of innings played a particular player in a series.
- **BL-OVERS**: Total no. of over bowled by a player during a series of matches.
- **BL-WKTS**: Total no. of dismissals made by a bowler in a tournament.
- **BL-AVG**: It is the ratio of runs conceded per wickets taken.
- **BL-SR**: The average number of balls bowled per wicket taken by a bowler.
- **BL-ECON**: The average number of runs conceded per over by a player when bowling.

For measuring the performance of an all-rounder depend on all the criteria of both batsman and bowler.
BT-INNS, BT-NO, BT-RUNS, BT-AVG, BT-SR, BT-FIFTY, BL-INNS, BL-SR, BL-OVERS, BL-WKTS, BL-AVG, BL-ECON.

In respect of cricket all the batting criteria and first three criteria of bowlers are positive that means increase the value of this property are more effective for increase of player performance whereas last three criteria of bowlers are negative in nature i.e. lesser value of these criteria give more importance to evaluate player importance in the team. In Twenty-20 cricket BT-RUNS, BT-AVG, BT-SR is the major property for batsman and BL-AVG, BL-SR, BL-ECON are plays the vital role for bowler.

3 Proposed Methodology
Flowchart of our new technique namely Modified Group Decision Algorithm (MGDA) is as follows:

Detailed steps of MGDA describe below:
Step-1: Decision matrix having n criteria/attributes and m alternatives. The decision matrix is represented as

$$D = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}$$  

(1)

Step-2: Normalization Methods for normalized the decision matrix.
2.1:

$$r_{ij} = \frac{x_{ij} - \min(x_i)}{\max(x_i) - \min(x_i)} \quad j = 1,2,\ldots,n$$  

(2)

2.2:

$$r_{ij} = \frac{x_{ij}}{\max(x_i)} \quad j = 1,2,\ldots,n$$  

(3)

2.3:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad j = 1,2,\ldots,n$$  

(4)

2.4:

$$r_{ij} = \frac{m x_{ij}}{\sum_{i=1}^{m} x_{ij}} \quad j = 1,2,\ldots,n$$  

(5)

Step-3: AHP

3.1: Saaty 9-point preference scale is used for constructing the pair-wise comparison matrix.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Compare factor of i and j</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Equally Important</td>
</tr>
<tr>
<td>3</td>
<td>Weakly Important</td>
</tr>
<tr>
<td>5</td>
<td>Strongly Important</td>
</tr>
<tr>
<td>7</td>
<td>Very Strongly Important</td>
</tr>
<tr>
<td>9</td>
<td>Extremely Important</td>
</tr>
<tr>
<td>2,4,6,8</td>
<td>Intermediate value between adjacent</td>
</tr>
</tbody>
</table>

Let A represents \(n \times n\) pair-wise comparison matrix:

$$A = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ a_{21} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & 1 \end{bmatrix}$$  

(6)

3.2: Normalize each cell by normalization 2.4 method.

3.3: Calculate Weight by

$$W_i = \frac{i}{n} \quad i = 1,2,\ldots,m$$  

(7)
3.4: Perform Consistency check.

3.4.1: \( C, \) an \( n\)-dimensional column vector describing the sum of the weighted values for the importance degrees of the attributes defined as
\[
C = [C]_{n \times 1} = AW^T, \quad i = 1, 2, ..., n \quad (8)
\]

3.4.2: To avoid inconsistency in the pair-wise comparison matrix, Saaty [3] suggested the use of the maximum eigen value \( \lambda_{\text{max}} \) to calculate the effectiveness of judgment. The maximum eigen value \( \lambda_{\text{max}} \) can be determined as follows:
\[
\lambda_{\text{max}} = \frac{\sum_{i=1}^{n} c_i v_i}{n}, \quad i = 1, 2, ..., n \quad (9)
\]

3.4.3: With \( \lambda_{\text{max}} \) value, a consistency index (CI) can then be estimated by
\[
CI = \frac{\lambda_{\text{max}} - n}{n - 1} \quad (10)
\]

3.4.4: Consistency ratio (CR) can be used as a guide to check the consistency
\[
CR = \frac{CI}{RI}
\]
where RI denotes the average random index with the value obtained by different orders of the pair-wise comparison matrices are shown in table 2. The value of CR \( \leq 0.10 \) is the consistent criteria.

Table 2. Table of random index

<table>
<thead>
<tr>
<th>Matrix Order</th>
<th>1, 2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.I.</td>
<td>0</td>
<td>0.52</td>
<td>0.89</td>
<td>1.12</td>
<td>1.26</td>
<td>1.36</td>
<td>1.41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Matrix Order</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.I.</td>
<td>1.46</td>
<td>1.49</td>
<td>1.52</td>
<td>1.54</td>
<td>1.56</td>
<td>1.58</td>
</tr>
</tbody>
</table>

5.1: WSM

5.1.1: Calculate the sum of \( v_{ij} \) for \( j = 1, 2, ..., n \) i.e;
\[
P_j = \sum_{i=1}^{m} v_{ij} \quad (13)
\]

5.1.2: Rank the alternatives according to \( P_i \) values in descending order.

5.2: TOPSIS

5.2.1: Obtain the ‘ideal’ (best) and ‘negative-ideal’ (worst) solutions. The ‘ideal’ (best) and ‘negative-ideal’ (worst) solutions can be expressed as
\[
v_j^+ = \left\{ \left( \sum_{i=1}^{m} v_{ij} \right)^{1/n} \right\},
\]

where \( J = \{ j = 1, 2, ..., n \}/j \) is associated with the beneficial attributes and \( J' = \{ j = 1, 2, ..., n \}/j \) is associated with the non-beneficial attributes.

5.2.2: Determine the separation distance between the alternatives.
The separation of each alternative from the ‘ideal’ solution is given by
\[
S_i^+ = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^+)^2}, \quad i = 1, 2, ..., m \quad (16)
\]
The separation from the ‘negative-ideal’ solution is denoted by
\[
S_i^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2}, \quad i = 1, 2, ..., m \quad (17)
\]

5.2.3: Calculate the relative closeness to the ideal solution, which can be expressed as
\[ C_i = \frac{S_i^-}{(S_i^+ + S_i^-)} \], \quad i = 1, 2, \ldots, m \quad (18)

5.2.4: Rank the alternatives according to \( C_i \) values in descending order.

5.3: COPRAS

5.3.1: Sums \( P_j \) of attributes values which larger values are more preferable (optimization direction is maximization taken) calculation for each alternative (line of the decision-making matrix) by the given formula:
\[ P_j = \sum_{i=1}^{m} v_{ij} \text{ for } j = 1, 2, \ldots, n \quad (19) \]

5.3.2: Sums \( R_j \) of attributes values which larger values are more preferable (optimization direction is maximization) calculation for each alternative (line of the decision-making matrix):
\[ R_j = \sum_{i=1}^{m} v_{ij} \text{ for } j = 1, 2, \ldots, n \quad (20) \]

5.3.3: Calculation of the relative weight of each alternative \( Q_j \):
\[ Q_j = P_j + \sum_{j=1}^{n} R_j \frac{1}{R_j \sum_{j=1}^{n} R_j} \quad (21) \]

5.3.4: Calculation of the utility degree of each alternative:
\[ N_j = \frac{Q_j}{Q_{\text{max}}} \times 100\% \quad (22) \]

5.4: VIKOR

5.4.1: Compute the values \( S_i \) and \( Q_i \), \( i = 1, 2, \ldots, m \), using the relations
\[ S_i = \sum_{j=1}^{n} w_j r_{ij} \]
\[ Q_i = \max_j \{ w_j r_{ij} : j = 1, 2, \ldots, n \} \quad (23) \]

5.4.2: Compute the index values \( R_i \), \( i = 1, 2, \ldots, m \), using the relation
\[ R_i = \frac{v(S_i - S^*)}{(S^* - S^*)} + \frac{(1-v)(Q_i - Q^*)}{(Q^* - Q^*)} \quad (24) \]

Where
\[ S^* = \min_i S_i, \quad S^- = \max_i S_i \]
\[ Q^* = \min_i Q_i, \quad Q^- = \max_i Q_i \]
and \( 0 \leq v \leq 1 \) with \( v \approx 0.5 \). \quad (25)

5.4.3: Rank the alternatives, sorting by the value of \( \{ S_i, Q_i \} \) in decreasing order and two compromise conditions must satisfied:

C1. Acceptable advantage:
\[ R(A^{(2)}) - R(A^{(1)}) \geq 1/(m-1) \], where \( A^{(1)} \) is the alternative with second position in the ranking list by \( R \); \( m \) is the number of alternatives.

C2. Acceptable stability in decision making:
Alternative \( A^{(1)} \) must also be the best ranked by \( \{ S_i \text{ or/and } Q_i \} \) \( \{ i = 1, 2, \ldots, m \} \).

If one of the conditions is not satisfied, then a set of compromise solutions is proposed, which consists of:
- Alternatives \( A^{(1)} \) and \( A^{(2)} \) if only condition C2 is not satisfied.
- Alternatives \( A^{(1)}, A^{(2)}, \ldots, A^{(M)} \) if condition C1 is not satisfied. \( A^{(M)} \) is determined by the relation \( R(A^{(M)}) - R(A^{(1)}) < 1/(m-1) \) for maximum \( M \) (the positions of these alternatives are close).

Step-6: Spearman Rank Correlation co-efficient \( \rho \) is calculated by the following formula:
\[ \rho = 1 - \frac{6\sum_{i=1}^{n} D_i^2}{n (n^2 - 1)} \quad (26) \]

where \( D_i = \) Difference between ranks of two different methods for same alternative and \( n = \) number of alternatives.

Table 3. Correlation coefficient values with various characteristics

<table>
<thead>
<tr>
<th>Correlation Coefficient value</th>
<th>Nature Of Correlation</th>
<th>Description of Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9 – 1.0</td>
<td>Very High</td>
<td>Very Strong</td>
</tr>
</tbody>
</table>

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Step-7: Establish the coefficient matrix of four method correlation coefficient between four methods.

Step-8: Calculate relative importance between 4 methods according the following steps-

8.1: For the given normalized coefficient matrix, $p_{ij}$, entropy $E_j$ of the set of alternatives for method $j$ is

$$E_j = -\frac{1}{\ln(m)} \sum_{i=1}^{m} p_{ij} \ln(p_{ij}),$$

for $j = 1, 2, ..., n$ (27)

8.2: Degree of diversification of the information provided by the outcomes is

$$D_j = 1 - E_j \quad \text{for } j = 1, 2, ..., n$$

(28)

8.3: Normalized weights of the methods are

$$W_j = \frac{D_j}{\sum_{i=1}^{n} D_j} \quad \text{for } j = 1, 2, ..., n$$

(29)

Step-9: Group Decision

9.1: Additive ranking rule is used for group decision as follows:

$$r_{a}^{G} = \frac{\sum_{DM=1}^{G} W_{DM} r_{a,DM}}{G}$$

(30)

9.2: Multiplicative ranking rule is as follows:

$$r_{a}^{G} = \left[ \prod_{DM=1}^{G} W_{DM} r_{a,DM} \right]^{1/G}$$

(31)

Where $G$ = number of MCDM method,

$W_{DM}$ = Relative influence of each MCDM,

$r_{a,DM}$ = Rank obtained for each alternative a in MCDM,

$r_{a}^{G}$ = Rank obtained for each alternative a.

Step-10: Overall performance appraisal and ranking of players.

4 Experiment & Result

Here we consider IPL last three session statistics as the decision matrix for cricketer performance assessment for different sector in cricket.

Table 4. Table for spin bowler of IPL-2012
Modified Group Decision Analysis (MGDA)--
The proposed methodology is basically a five
stage algorithm which consist the following stages-
First stage is calculated the weight of the
criteria with the help of Saaty’s pair wise AHP
method.

Table 5. Pair-wise Comparison of bowling criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>INNS</th>
<th>OVERS</th>
<th>WKTS</th>
<th>AVG</th>
<th>SR</th>
<th>ECON</th>
</tr>
</thead>
<tbody>
<tr>
<td>INNS</td>
<td>1.000</td>
<td>1.000</td>
<td>0.333</td>
<td>0.200</td>
<td>0.250</td>
<td>0.167</td>
</tr>
<tr>
<td>OVERS</td>
<td>1.000</td>
<td>1.000</td>
<td>0.500</td>
<td>0.250</td>
<td>0.333</td>
<td>0.250</td>
</tr>
<tr>
<td>WKTS</td>
<td>3.000</td>
<td>2.000</td>
<td>1.000</td>
<td>0.500</td>
<td>1.000</td>
<td>0.500</td>
</tr>
<tr>
<td>AVG</td>
<td>5.000</td>
<td>4.000</td>
<td>2.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>SR</td>
<td>4.000</td>
<td>3.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Weights of the Bowler’s criteria are as follows:

\[
\begin{align*}
W_{\text{INNS}} &= 0.0522, \\
W_{\text{AVG}} &= 0.2560, \\
W_{\text{Overs}} &= 0.0649, \\
W_{\text{WKTS}} &= 0.1503, \\
W_{\text{ECON}} &= 0.2643
\end{align*}
\]

Second stage is used different MCDM
method to evaluate performance of the players
with ranking.

Table 6. Ranking in different method

<table>
<thead>
<tr>
<th>ID</th>
<th>TOPSIS Rank</th>
<th>COPRAS Rank</th>
<th>VIKOR Rank</th>
<th>WSM Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>0.676</td>
<td>0.5258</td>
<td>0.5609</td>
<td>0.721</td>
</tr>
<tr>
<td>15</td>
<td>0.5833</td>
<td>0.2916</td>
<td>0.7036</td>
<td>0.4426</td>
</tr>
<tr>
<td>19</td>
<td>0.7985</td>
<td>0.6231</td>
<td>0.336</td>
<td>0.7085</td>
</tr>
<tr>
<td>25</td>
<td>0.6356</td>
<td>0.4479</td>
<td>0.4571</td>
<td>0.8235</td>
</tr>
<tr>
<td>26</td>
<td>0.5752</td>
<td>0.5818</td>
<td>0.4738</td>
<td>0.5877</td>
</tr>
<tr>
<td>31</td>
<td>0.6154</td>
<td>0.3745</td>
<td>0.4775</td>
<td>0.6194</td>
</tr>
<tr>
<td>38</td>
<td>0.3325</td>
<td>0.23452</td>
<td>0.67253</td>
<td>0.3335</td>
</tr>
<tr>
<td>43</td>
<td>0.6264</td>
<td>0.3637</td>
<td>0.6544</td>
<td>0.3087</td>
</tr>
<tr>
<td>44</td>
<td>0.7132</td>
<td>0.5674</td>
<td>0.30765</td>
<td>0.7114</td>
</tr>
<tr>
<td>54</td>
<td>0.4979</td>
<td>0.371404</td>
<td>0.48902</td>
<td>0.5574</td>
</tr>
<tr>
<td>56</td>
<td>0.6455</td>
<td>0.4464</td>
<td>0.4294</td>
<td>0.6758</td>
</tr>
<tr>
<td>72</td>
<td>0.6260</td>
<td>0.370891</td>
<td>0.48297</td>
<td>0.6101</td>
</tr>
<tr>
<td>75</td>
<td>0.3786</td>
<td>0.403804</td>
<td>0.6333</td>
<td>0.4692</td>
</tr>
<tr>
<td>79</td>
<td>0.5074</td>
<td>0.377087</td>
<td>0.45355</td>
<td>0.5942</td>
</tr>
<tr>
<td>90</td>
<td>0.6581</td>
<td>0.51536</td>
<td>0.35032</td>
<td>0.6690</td>
</tr>
<tr>
<td>91</td>
<td>0.8579</td>
<td>0.17101</td>
<td>0.17053</td>
<td>0.8579</td>
</tr>
<tr>
<td>99</td>
<td>0.6588</td>
<td>0.46434</td>
<td>0.44072</td>
<td>0.6101</td>
</tr>
<tr>
<td>116</td>
<td>0.6801</td>
<td>0.50762</td>
<td>0.50483</td>
<td>0.6626</td>
</tr>
<tr>
<td>118</td>
<td>0.5580</td>
<td>0.327251</td>
<td>0.4839</td>
<td>0.586</td>
</tr>
</tbody>
</table>

Spearman co-efficient correlation technique
describes the correlation between the methods in
stage three.

Table 7. Correlation Coefficient Matrix

<table>
<thead>
<tr>
<th>2012</th>
<th>TOPSIS</th>
<th>COPRAS</th>
<th>VIKOR</th>
<th>WSM</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOPSIS</td>
<td>1.000</td>
<td>0.9381</td>
<td>0.9272</td>
<td>0.9401</td>
</tr>
<tr>
<td>COPRAS</td>
<td>0.9381</td>
<td>1.000</td>
<td>0.9585</td>
<td>0.9471</td>
</tr>
<tr>
<td>VIKOR</td>
<td>0.9272</td>
<td>0.9585</td>
<td>1.000</td>
<td>0.9273</td>
</tr>
<tr>
<td>WSM</td>
<td>0.9401</td>
<td>0.9471</td>
<td>0.9273</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Each MCDM methods are very strong relationship
with each other according Spearman Rank
Correlation Coefficient Rule.

Entropy method produces the importance between
the MCDM methods in the fourth stage.

\[
\begin{align*}
W_{\text{TOPSIS}} &= 0.249736, \\
W_{\text{COPRAS}} &= 0.250474, \\
W_{\text{VIKOR}} &= 0.249876, \\
W_{\text{WSM}} &= 0.249914
\end{align*}
\]

Finally at the last stage, Additive & Multiplicative
ranking method measures the overall performance and
ranking of the players.
Table 8. Overall Ranking

<table>
<thead>
<tr>
<th>ID</th>
<th>Player</th>
<th>Add. Value</th>
<th>Rank</th>
<th>Mul. Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
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<td>All Chickilla</td>
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<td>10</td>
<td>0.181402</td>
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<td>0.173672</td>
<td>7</td>
<td>0.173138</td>
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<td>0.124751</td>
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<tr>
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<td>0.135089</td>
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<tr>
<td>38</td>
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<tr>
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<td>0.113543</td>
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<td>0.123195</td>
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<td>0.099235</td>
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<td>28</td>
<td>0.119599</td>
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</tr>
</tbody>
</table>

5 Conclusion

This article hence presented puts forward the idea of integrating the several multi criteria decision making techniques in a single algorithm in the field of sports for an optimized performance appraisal for players. Our proposed technique MGDA overcomes the limitations of different MCDM methods for ranking by provides us better solution in the field of multi criteria analysis.

MGDA was applied for batsman, fast bowler and spin bowler statistics of IPL session IV, V and VI separately and produce accurate result every time. For calculating the weights of the criteria using AHP satisfy the consistency checking property which proofs its trueness. Every time correlation between two methods produces very strong relationship which suggests that our individual MCDM methods calculate precise results.

The additive ranking and the multiplicative ranking of the players are almost same which confirmed the accuracy of the technique. By using MGDA the IPL franchisee owner can measure the player performance and may be calculated the player true salary which they offer to a player so that their team performs according their potentiality and they make profit from IPL.

Our new method used well known techniques in the modified way with structure format to help the decision maker to make their decision with no trouble and very swiftly. It is also used in various field of multi criteria problem and provides optimum solution to find the performance appraisal and ranking according the alternatives performance.

References:


